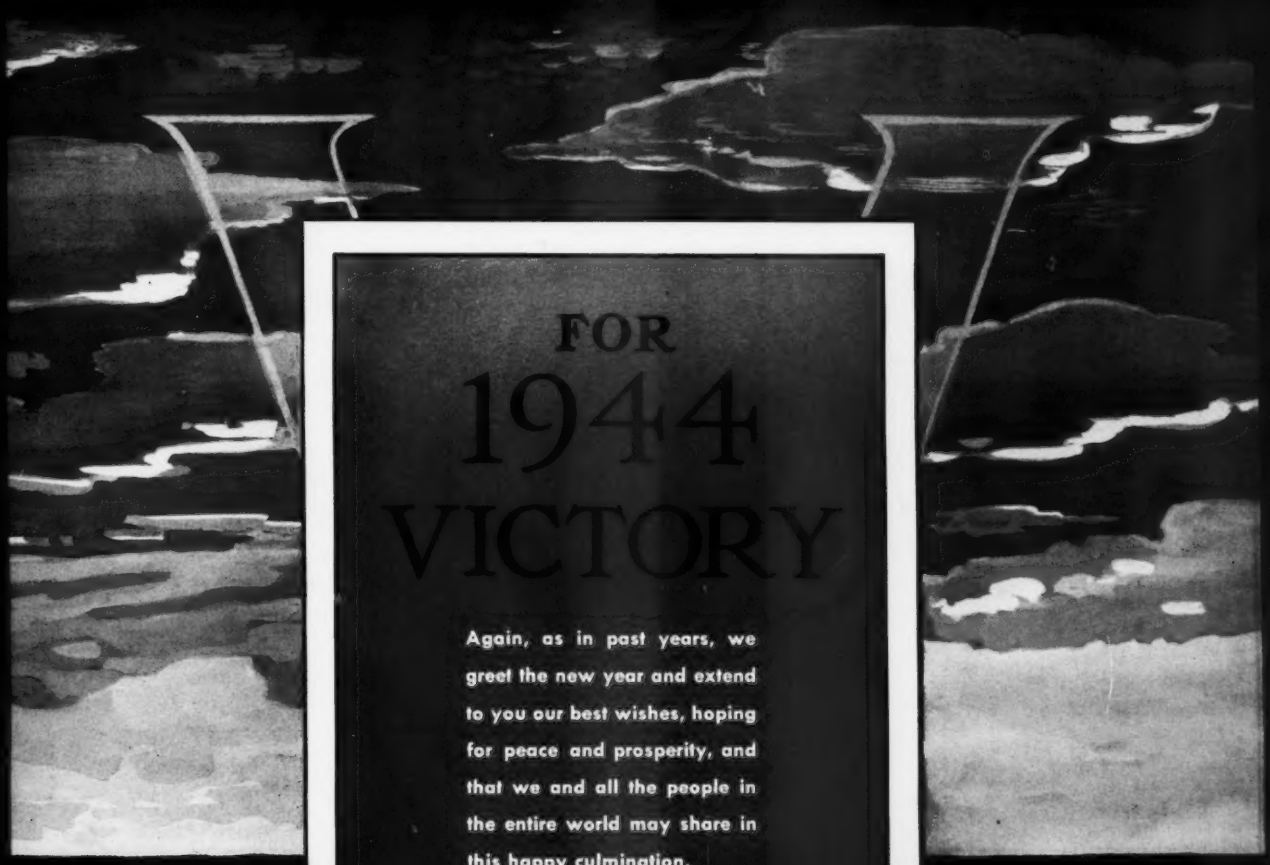
Railway Engineering Maintenance



FOR
1944
VICTORY

Again, as in past years, we greet the new year and extend to you our best wishes, hoping for peace and prosperity, and that we and all the people in the entire world may share in this happy culmination.

THE P. & M. CO.

Reliance **HY-CROME** *Spring Washers*

SERVING THE NATION

HY-PRESSURE
HY-CROME

● Like men drafted into the armed forces, Railroad track has been drafted too. Men—Materials—Weapons of War—must move over Railroad track. Keep it in condition to stand up under the wartime traffic load. Hy-Pressure HY-CROME Spring Washers are the remedy for loose track joint bolts and high maintenance costs. Keeping your track in 1-A condition is your contribution to final victory.

EATON MANUFACTURING CO. RELIANCE SPRING WASHER DIVISION, MASSILLON, OHIO

Sales Offices: New York • Cleveland • Detroit • Chicago • St. Louis • San Francisco • Montreal

Published monthly by Simmons-Boardman Publishing Corporation, 105 W. Adams St., Chicago 3, Ill. Subscription price: United States and Possessions, and Canada, $2.00; Foreign, $3.00. Single copies 35 cents. Entered as second-class matter January 20, 1933, at the postoffice at Chicago, Ill., under the act of March 3, 1879, with additional entry at Mount Morris, Ill., postoffice. Address communications to 105 W. Adams St., Chicago 3, Ill.

BRIDGES GET THE *once-over treatment* FOR RUST

. . . And "once over" is enough when you use NO-OX-ID. It penetrates to the base metal, loosening the old rust scale. As patches fall off, the spots are touched up. From one to three years later, a finishing coat of NO-OX-ID Filler can be applied with a minimum of labor to give continuous protection.

No expensive pre-cleaning is necessary with NO-OX-ID . . . in fact, railroads using NO-OX-ID report savings up to 50% on bridge maintenance.

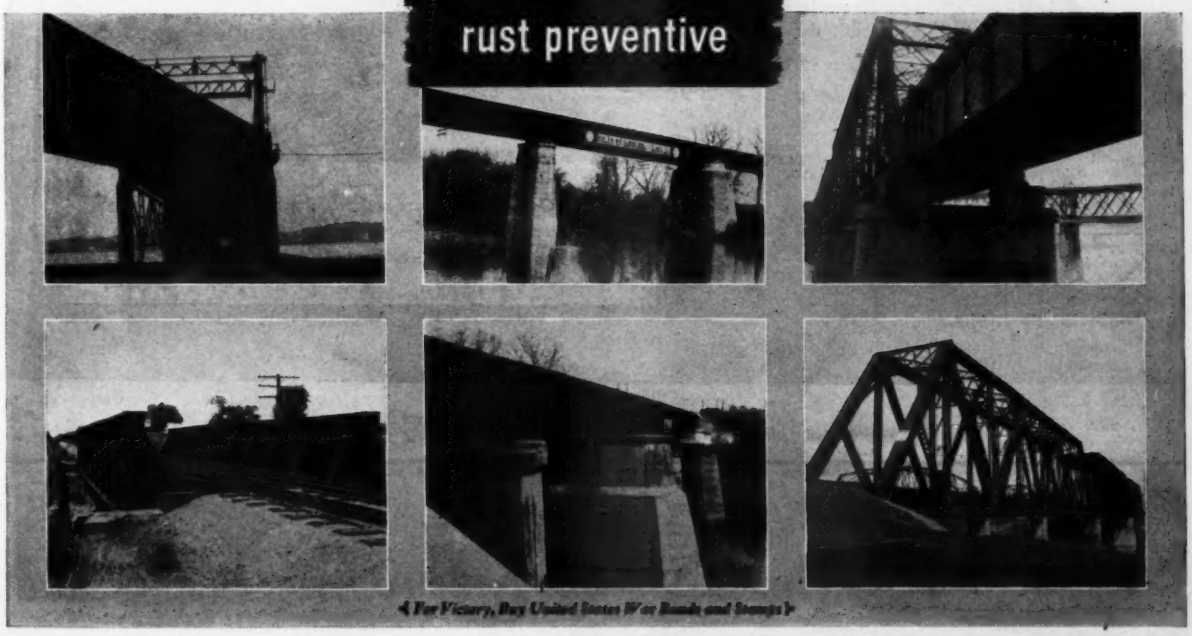
Under present conditions, with fewer men to do the work, the protection afforded by one application plus the speed with which it can be done is most important. Write for data book . . . it explains the very simple method of application. Dearborn Chemical Company, Dept. U, 310 S. Michigan Avenue, Chicago, Illinois. NEW YORK • LOS ANGELES • TORONTO

"THE LEADER FOR 25 YEARS"

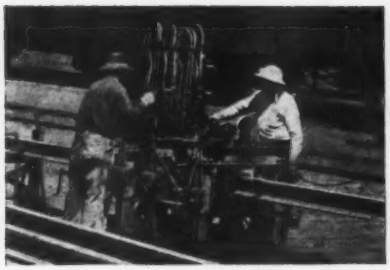
NO-OX-ID

IRON RUST

rust preventive

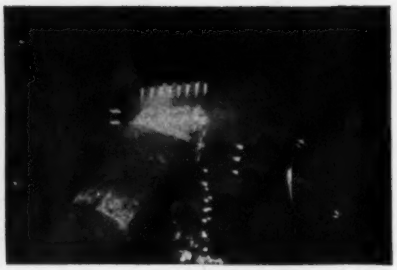


(For Victory, Buy United States War Bonds and Stamps)



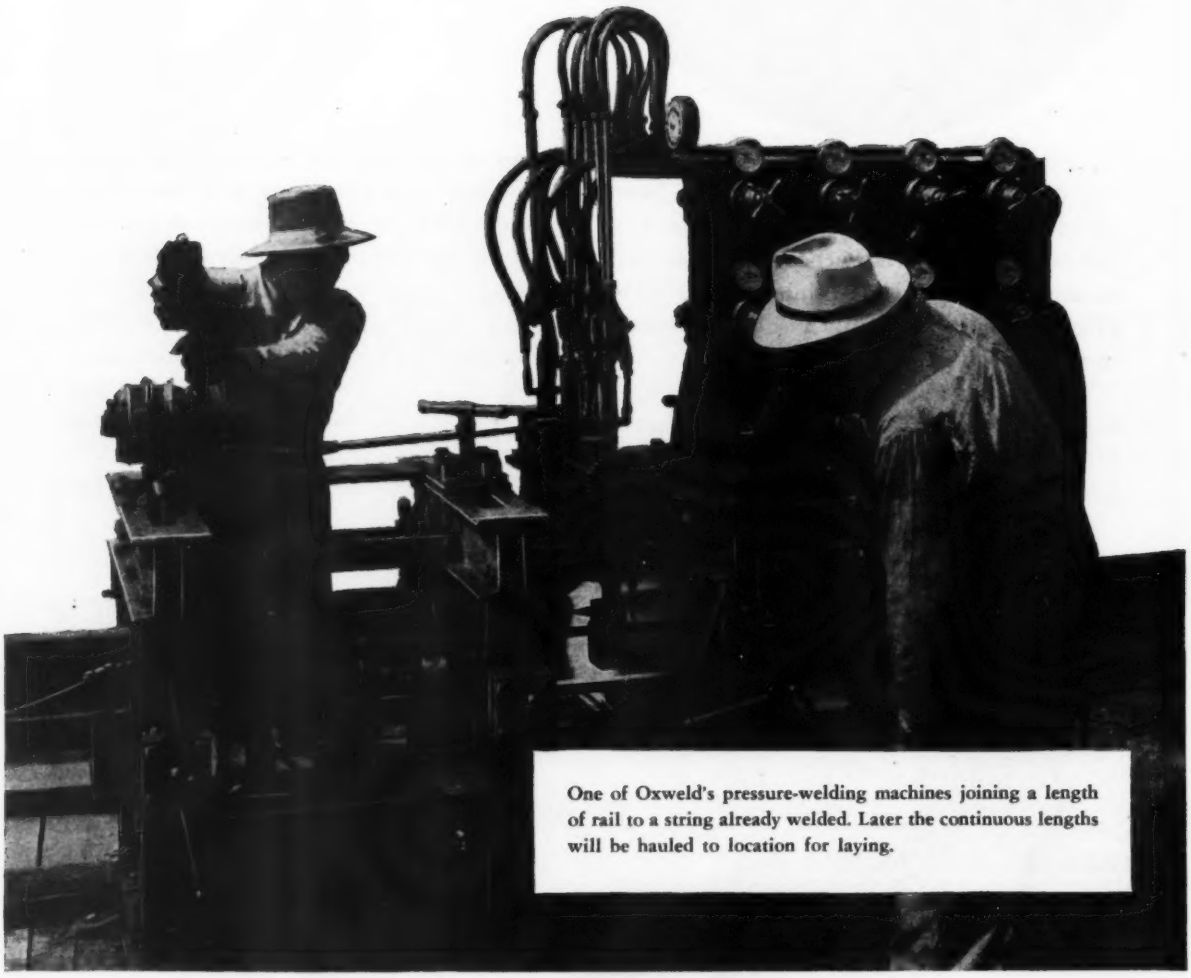
WELDING

TRIMMING



NORMALIZING

Plan Your Pressure-



One of Oxweld's pressure-welding machines joining a length of rail to a string already welded. Later the continuous lengths will be hauled to location for laying.

GRINDING

POLISHING

FINISHED WELD

Welding Program Now...

To Eliminate Rail-End Batter and Joint Maintenance at Key Locations

When Oxweld's pressure-welding method is used to join new or relay rails, a continuously smooth surface is provided, maintenance of joints and signal bonds is done away with, and the possibility of rail-end batter is eliminated. For these reasons, pressure-welded rail is being used increasingly in a variety of key locations.

In tunnels, for example, the greatest advantage of pressure-welded rail lies in the elimination of joint bars, bonds, or other connections where moisture, dripping water, and gases collect, causing rail corrosion.

On bridges, the smooth riding surface of pressure-welded rail substantially reduces impact. In stations, where traffic is heavy and maintenance difficult, welded rails have proved their worth. Once the rails are laid—and covered, if desired—joint maintenance can be forgotten.

These and other advantages of pressure-welded rail make it particularly suitable not only in these locations, but also in road crossings, on overhead structures, in lead rails through switches, and even in open track.

Welding schedules should be planned now—in advance—so as to obtain the full utility of available equipment during the next few months and thus to have next season's pressure-welded rails ready when needed.

BUY UNITED STATES WAR BONDS AND STAMPS

THE OXWELD RAILROAD SERVICE COMPANY

Unit of Union Carbide and Carbon Corporation

Carbide and Carbon Building UCC Chicago and New York

SINCE 1912—THE COMPLETE OXY-ACETYLENE SERVICE FOR AMERICAN RAILROADS

PHOTO
MACFADDEN PUBLICATIONS

STEEL SCRAP is worth its weight in lives!

Your country needs 15 million tons of steel scrap this winter.

Every ton could well save an American life in the big push. The fighting Yanks must have grenades, flame-throwers, landing barges, tanks, and guns in quantities outstripping all previous requirements. They'll need plenty of weapons to enlarge the bridgeheads on Europe.

Steel is the backbone of war weapons, and there won't be enough unless we turn in the scrap.

Heavy scrap is especially desirable. Search your plants, buildings, yards, and warehouses with renewed vigor. Take another look at obsolete tools, dies, and machines; at everything made of iron or steel. Make this a rule: if it won't serve some useful purpose scrap it!

Challenge the Salvage Committee of your company to do another great job. Comb your plant from top to bottom, separate the various kinds of scrap as best you can, and then call the scrap dealer. (The Steel Industry will pay government-established prices for all the scrap iron you recover.) The American Rolling Mill Company, 191 Curtis St., Middletown, Ohio.

EXPORT: THE ARMCO INTERNATIONAL CORPORATION.

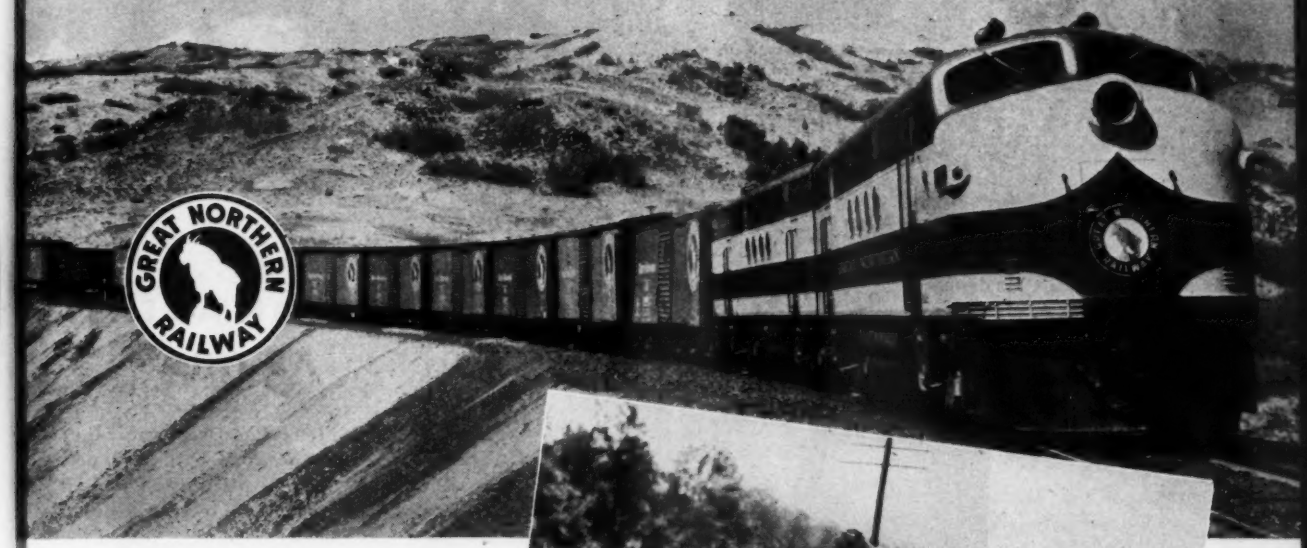
ARMCO

TURN IN ALL YOUR SCRAP

THIS ADVERTISEMENT IS IN SUPPORT OF THE SALVAGE PROGRAM OF THE CONSERVATION DIVISION OF THE WAR PRODUCTION BOARD

MODERN FREIGHT SERVICE

Demands Modern Track Maintenance



WOOLERY
Tie Cutters
Like Diesel Locomotives Meet Wartime Tempo

Just as the Great Northern's utilization of modern diesel locomotives expedites the movement of wartime freight over the Rocky Mountains, so does its use of 54 Woolery Tie Cutters enable Great Northern track maintenance forces to make every minute and every man count for more in removing the hundreds of thousands of crossties that must come out of main and branch lines of this progressive railway every year.

The Woolery Tie Cutter requires only one man to operate. It saws the tie into three easily-removed pieces, leaving the tie-bed undisturbed, ready to support the new tie . . . it eliminates trenching and reduces tamping to a minimum. It reduces tie renewal costs as much as 30 per cent and shortens renewal schedules by weeks.

Other WOOLERY Maintenance Units

Woolery Weed Burners and Creosote Sprayers are also helping many railroads maintain track the modern way, with minimum expenditure of labor, time and money.

WOOLERY MACHINE COMPANY

MINNEAPOLIS — Pioneer Manufacturers of — MINNESOTA

RAILWAY MAINTENANCE EQUIPMENT

TIE CUTTERS • SWITCH HEATERS • MOTOR CARS

RAILWAY WEED BURNERS • BOLT TIGHTENERS

WHEN WE SAY

Portable

WE MEAN AS EASY AS THIS

BARCO TYTAMPERS are so portable they can be carried easily by one man. Each unit is self-contained and no auxiliary equipment is needed. They can be quickly assembled for gang tamping or readily distributed for spot tamping. Your BARCO TYTAMPER means a maximum output per man . . . more time on the job . . . cost reduction . . . and the finest tamping job possible. Determine your TYTAMPER needs for 1944 just as quickly as possible and place your BARCO TYTAMPER order early. Write to: Barco Manufacturing Co., Not Inc., 1805 Winnemac Avenue, Chicago 40, Illinois.

BARCO TYTAMPERS

FIRST ON THE RAILS AND STILL FIRST

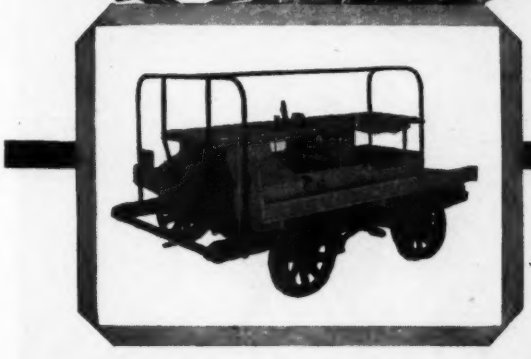
Designed by Men Who Know Railroading

Fairbanks-Morse Sheffield and Eclipse Motor cars are still first on the rails because they have *all* of the features a car should have . . . and all of those features are *good.*

There are 12 models—water cooled, air cooled, chain drive, belt drive. *Eclipse* models are belt-driven. *Sheffield* Models are chain-driven.

Sheffield
Model 40B with cab

Two-cylinder air-cooled engine permits full load operation for hours without overheating. Engine develops exceptionally high torque at low speeds. Friction transmission. Chain drive. Steel frame. Thousands in service.



Sheffield Model 40B with special safety railing

Sheffield Model 53
Weighs 929 pounds with rear end lift of only 124 pounds. Has 8- to 13-hp., water-cooled motor with air-cooled head. Space for full section gang and tools.

FAIRBANKS, MORSE & CO.
FAIRBANKS-MORSE BUILDING, CHICAGO, ILL.
RAILROAD SALES OFFICES: NEW YORK • BOSTON • CHICAGO • ST. LOUIS • ST. PAUL
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PHOTO-ELASTIC STUDIES OF HEADFREE FLANGED JOINT BARS

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Intensity of Strain is proportional to the number of lines

Bolting Strains

Bolting and Eccentric Loading Strains

MAXIMUM STRENGTH

MINIMUM WEIGHT

Buy War Bonds

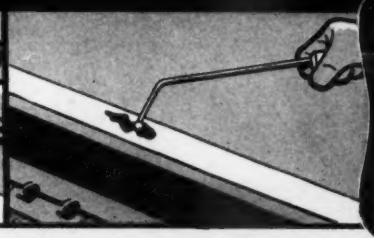
THE RAIL JOINT COMPANY INC.

50 CHURCH STREET NEW YORK, N. Y.

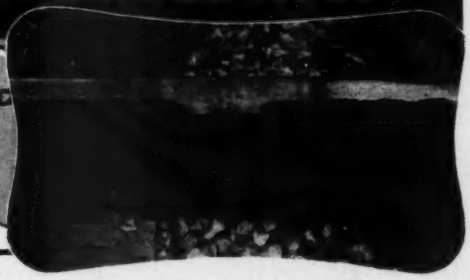
How to repair wheel burns on rail...

...by welding with Airco Railroad Rods

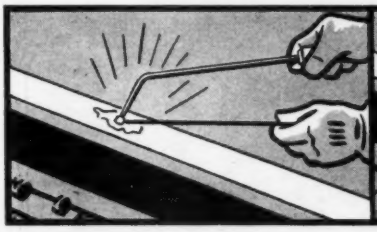
1. Remove loose and blistered metal by chipping with a hammer and chisel. Brush out cavity with wire brush.



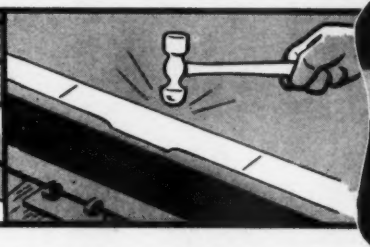
2. Quickly wash out remaining refuse metal with Airco No. 9 or 10 bulbous type tip. This also anneals area around cavity.



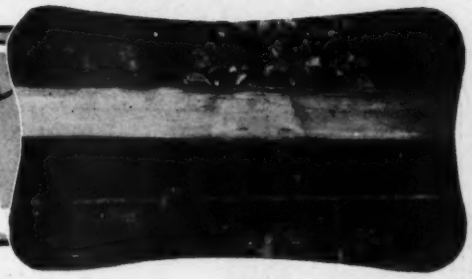
Welded rail-burn spot after being peened and flattened and restored to its original plane.



3. When cavity is cherry red, withdraw flame. Fissures will be instantly visible. If no fissure appears, fill in cavity by quickly welding with Airco R.R. rod.



4. Peen the deposit with hand hammer, and follow with grinder or flatter. No quenching or heat treatment of any kind should be used after building up.



This built-up burned spot has been in service for six months. Heat marks are barely visible.

This method of repairing wheel burns on rail is fast and inexpensive, costing from $.20 to $.40 for each spot filled. The procedure shown is applicable to most wheel-burn welding operations. However, if a shelled-out burned spot is over 3" long, the preferred method is to build it up in sections of 1½" to 2", allowing the rail to cool down between applications.

This welding maintenance method is typical of many flame and arc processes that are expediting today's track maintenance operations. For complete details on the best materials and methods to use—or for assistance in their application—write your nearest Air Reduction office.

★ BUY UNITED STATES WAR BONDS ★

AIRCO WILSON

AIR REDUCTION

General Offices: 60 EAST 42nd STREET, NEW YORK 17, N. Y.

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Piling Contractors Benefit 4 Ways from

Monotubes' SPECIAL FEATURES

WHEN building fast for hard-pressed war plants—and building well for postwar permanence, you can't beat Union Metal all-steel, tapered Monotubes for . . . SPEEDY DRIVING, SPEEDY HANDLING, SPEEDY INSPECTION, and SPEEDY EXTENSION.

Monotubes are so strong and rigid they require no heavy core or mandrel, and can be driven with average job equipment.

Made of cold-rolled steel, yet light in weight, they can be handled quickly and economically, and their hollow tubular design permits easy, thorough inspection prior to concreting.

Extendible Monotubes make possible the installation of varying pile lengths without delay or waste —even in low headroom.

Monotubes are available in a gauge, size and taper to meet the most exacting requirements in any soil condition. Write for Catalog 68A.

THE UNION METAL MANUFACTURING CO. • Canton, Ohio

UNION METAL

Monotube Pile Casings

ASK THE MAN WHO USES IT

BOSS, DAT'S THE BESTA STUFF WE EVER HAVE 'ON DIS RAILROAD. THE BOLTS AND NUTS SHE DON'T RUST, THE JOINTS SHE DON'T FREEZE SO MUCH!
RMC PLASTIC JOINT LUBRICANT
RAILWAY MAINTENANCE CORPORATION

Get a Supply of RMC PLASTIC RAIL JOINT PACKING now—while you can get ALL you need.

End CORROSION HERE WITH RMC PLASTIC

RAILWAY MAINTENANCE CORP.

PITTSBURGH · PENNSYLVANIA

DUFF-NORTON

TRACK JACKS

—Speed your track maintenance

—Stretch your manpower

Easy to operate—absolutely safe—sturdy enough for the toughest service—Duff-Norton Track Jacks help your men speed track maintenance work.

With Duff-Norton Track Jacks on the job your Rolling Stock rolls smoothly over well-kept road bed. Write for descriptive literature.

THE DUFF-NORTON MANUFACTURING CO.

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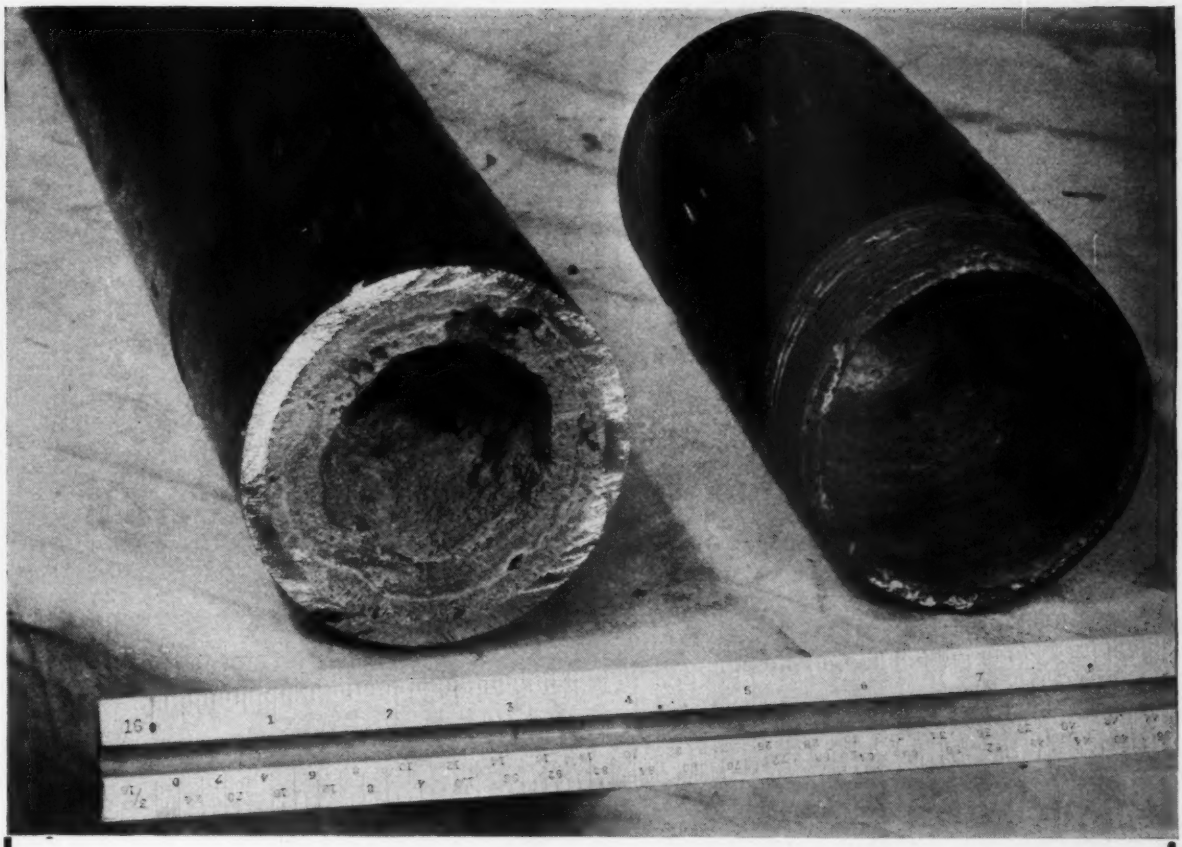

It's Hard To Get New Pipe

but You **CAN** *Get Better Drainage!*

With the complete pipe cleaning, engineering and operating service we offer to the railroads, it's a simple and economical matter for you to get as much as two or three times your present flow volume from the pipes you are now using.

We Make Your Pipes Clean As New!

Get Increased flow

Lower operating costs

Greater fire protection from your present pipes and water mains

Write us today for illustrated circulars, with actual facts and case histories from the field, showing how we can aid you.

PITTSBURGH PIPE CLEANER CO.
433 Melwood Street Pittsburgh 13, Penna.

JOB ANALYSIS

of a recent Cleaning Contract at Youngstown, Ohio

Length of main	10,600 ft.
Size of main	8" Cast iron
Cleaning time	75 minutes
Deposit removed	60 tons
Power savings	16%
Type of cleaning	Hydraulic
45 degree ells	
Quantity water before cleaning	390 gals./min. at 90# pressure
Quantity water required	450 gals./min.
Quantity water after cleaning at 40#	750 gals./min. (estimated)
Present pumping time at 40# pressure	7 hrs. less than before cleaning

1944

There is a radiance and a glory in the darkness could we but see; and to see we have only to look. And so at this New Year, we greet you—not quite as the world sends greetings, but with the prayer that for you, now and forever, the day breaks and the shadows flee away.—Fra Giovanni (1603)

WOODINGS-VERONA TOOL WORKS
WOODINGS FORGE and TOOL COMPANY

VERONA, PA.

Topping a Long List of "Impossibles" During '43

AMERICA'S RAILROADS MADE 1=2

● The railroads in America hauled more freight and rendered more passenger service in 1943 than during 1918, the peak year of the first World War, plus 1939. For that performance, Warren Tool Corporation doffs its hat to the railroads.

Our products contributed in a small way to this magnificent accomplishment by helping to save many precious minutes. With Flex-Toe, for instance, two men can pull as many spikes as three men can with ordinary claw bars. Because the chisels, mauls, and sledges in the Devil Line are made from the finest grade of electric furnace alloy tool steels, they help reduce lost-time accidents caused by chipping and spalling. . . . Since the beginning of World War II, production of Flex-Toe Claw Bars and Devil Line Tools has been increased 100%.

WARREN HEAVY HAND TOOLS

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WARREN TOOL CORP. • WARREN, OHIO

230 carloads of Johns-Manville
war products every 24 hours
PART of the tremendous war-time tonnage that the railroads are transporting every day consists of Johns-Manville products on their way to help win the war.
And helping transport these war products, are special J-M materials developed for America's railroads: Train Line Insulation, Boiler Lagging, Pipe Insulation, Locomotive Packings, Conduits for signal systems and J-M Building Materials for railroad structures.
For information on these and other J-M products, write to Johns-Manville at New York, Chicago, Cleveland, St. Louis or San Francisco.
Insulations • Packings
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PRODUCTS
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86 YEARS OF SERVICE TO TRANSPORTATION

M9 Series D—1-2 man Inspection Car with spring mounted chassis for smooth riding.

Of All The Cars In Service Today More Than Half Are Fairmonts

The question itself probably furnishes the most definite answer. Fairmont's undisputed leadership in this field stems from the willingness of a highly specialized organization to pace its progress with that of the railroads . . . to understand the problems and to meet them with motorized equipment designed and constructed to cope with all phases of maintenance work.

The development and record of the M9 Series D exemplifies the comprehensive engineering that is a fundamental part of all Fairmont cars, large as well as small.

This is a 1-2 man car of many uses with normal load capacity of 500 lbs., yet held to a light extension lift. Its power plant is the famous Fairmont 5-8 H. P. RO Hy-Load Roller Bearing Engine . . . a known quantity to operators and executives alike.

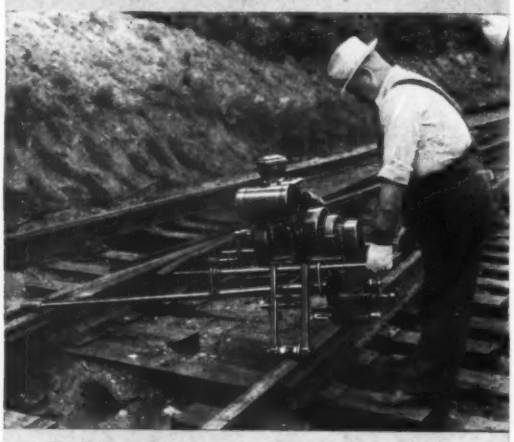
In the entire family of Fairmont Motor Cars, there are exclusive features of design . . . all centered upon fitting each for the broadest scope of service; for dependable performance and low cost operation. Fairmont Railway Motors, Inc., Fairmont, Minn.

Performance ON THE JOB COUNTS

Fairmont Railway Motor Cars

Faster Drilling at Less Cost with the NORDBERG RAIL DRILL

With the simple controls provided, this drill can be operated by ordinary track labor.



Drill is raised on supporting members whenever it is transported.

Carried on flanged rollers, the drill is easily moved along the rail.

The ease of operation and handling of the Nordberg Rail Drill is important these days when maintenance work must be accomplished in face of acute labor shortages. The controls are so simple that the drill can be set up and operated with the class of labor regularly used for track work. Because of the simple adjustments, no time is lost in the drilling operation. When raised on the flanged rollers, it is easily pushed along the rail to the new location. This is done by one man and saves much time in moving.

The simple chuck for holding the flat bit requires no tools for tightening. The bit is automatically and positively gripped. This is also a time saver.

Investigate the merits of the Nordberg Rail Drill for your rail drilling operations.

PUT THESE NORDBERG TOOLS TO WORK ON YOUR WARTIME MAINTENANCE

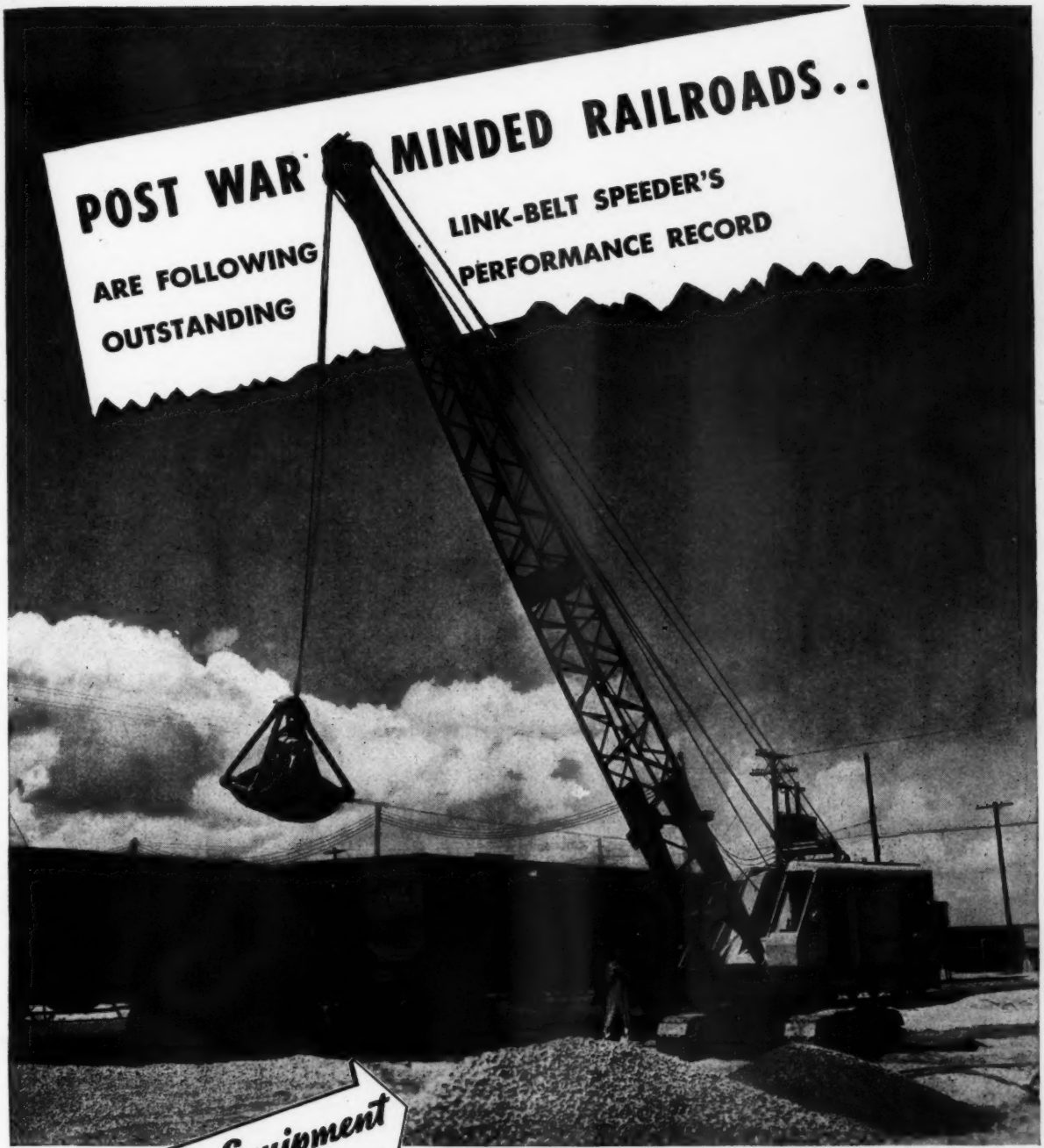
Adzing Machine	Power Jack
Spike Puller	Track Wrench
Rail Drill	Rail Grinder

Track Shifter

NORDBERG MACHINERY

NORDBERG MFG. CO. MILWAUKEE WISCONSIN

Export Representative—WONHAM Inc.—44 Whitehall St., New York



Off-Track Equipment

These rugged, precision engineered machines are providing railroads from coast to coast with the advantages of off-track equipment—and the special Link-Belt Speeder advantages of fingertip control, rapid booming, long, hard, maintenance-free service. There are 25 different models available—a shovel, dragline or crane to fit every type and size job!

8907

LINK-BELT SPEEDER

Builders of the Most Complete Line of
SHOVELS-CRANES-DRAGLINES

LINK-BELT SPEEDER CORPORATION, 301 W. PERSHING ROAD, CHICAGO 9, ILL.
A DIVISION OF LINK-BELT COMPANY

NEW MUSCLES.....

FOR OLD BRIDGES

. . . The facilities of our New and thoroughly modern plant are now available for steel fabrication work. The new Morrison Fabricating shop . . . with its modern equipment and skilled operating force . . . may prove the answer to many a bridge engineer's problems. In it, we can fabricate and provide steel plates and shapes (from your specifications and blue prints) for repairing or strengthening existing structures. Morrison's Management, Engineering and Operating staffs are long experienced in this type of work, fully coordinated to complete your job with accuracy and speed. Your drawings, request for estimate with bill of material entrusted to us will get you prompt action without obligation. May we hear from you?

MORRISON METALWELD PROCESS, INC.
A SUBSIDIARY OF
MORRISON
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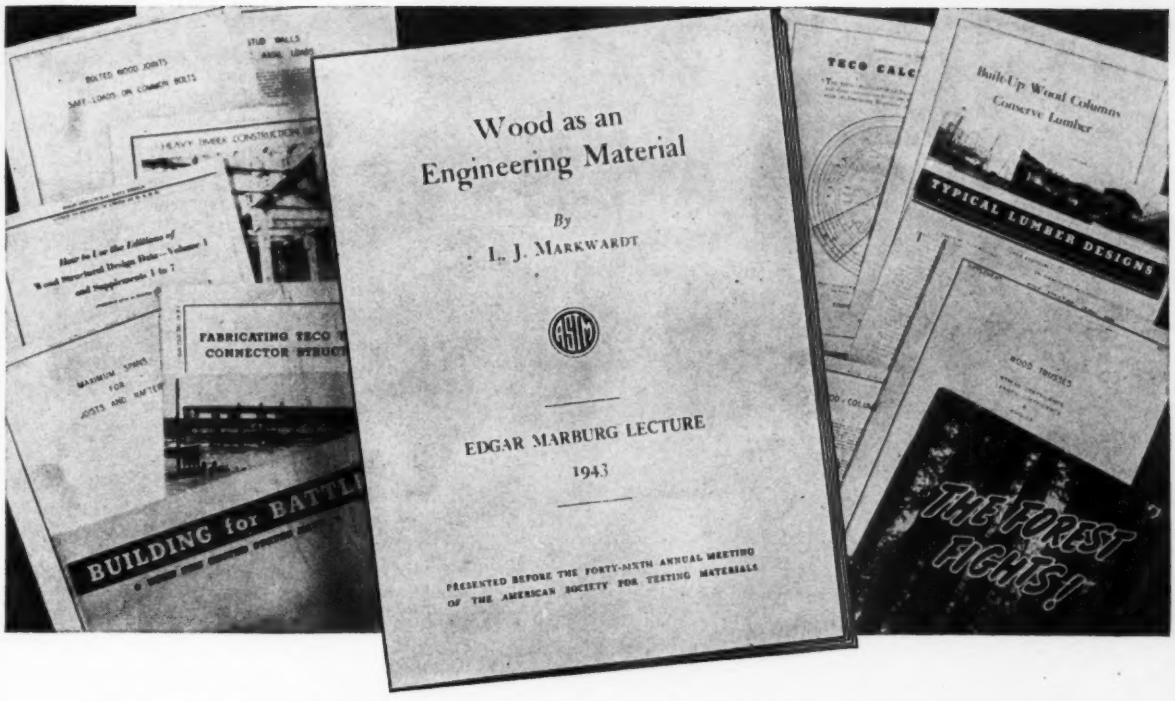
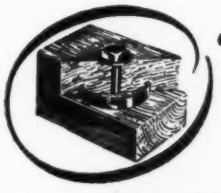
EXECUTIVE OFFICES . . . BUFFALO 12, N. Y.
CHICAGO 4, ILL. BIRMINGHAM 3, ALA.



BASIC TIMBER ENGINEERING DATA FOR ARCHITECTS AND ENGINEERS



"WOOD as an Engineering Material," by L. J. Markwardt, distinguished research authority of the U. S. Forest Products Laboratory, was presented at the invitation of the American Society for Testing Materials as the 1943 Edgar Marburg Lecture.

The purpose of this annual lecture is to present outstanding developments in the extension of knowledge of engineering materials.

In continuation of Teco's practice of making latest information on timber available to engineers and architects, copies of this lecture have been obtained and are available on request.

Keep posted on new timber design developments. Use the *Teco* Services and *Teco* Timber Connectors and Tools.

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Washington — Chicago — Minneapolis
Portland, Oregon.

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TIMBER ENGINEERING COMPANY
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Please send me by return mail a Free copy of *"Wood As An Engineering Material"*.

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Firm Name.....

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No. 181 of a series

Railway Engineering and Maintenance

SIMMONS-BOARDMAN PUBLISHING CORPORATION

105 WEST ADAMS ST.
CHICAGO, ILL.

Subject: Paper

January 1, 1944

Dear Reader:

In our April issue and again in August, I told you of the increasingly acute shortage that was developing in paper and of the measures that we were adopting to meet the reduction of 10 per cent requested by the War Production Board. To comply with this request we reduced the page trim size or margins, eliminated unnecessary copies by stopping subscriptions more promptly after expiration, curtailed the number of copies provided for office use and adopted other measures to conserve paper. With the August issue we also reduced the base weight of our sheet from 50 lb. to 45 lb. Through these measures our six Simmons-Boardman publications, including Railway Engineering and Maintenance, reduced their consumption of paper in 1943 more than 13 per cent, or nearly a third more than the goal set for us by W.P.B. In other words, we reduced our paper demand more than 165,000 lb.

In this effort we shared with other magazine and periodical publications using appreciable quantities of paper who, as a group reduced their consumption 11 per cent below the base period of 1942. For this co-operation Donald Nelson, chairman of W.P.B. has written us, in common with the other participating magazine publishers, to "commend the industry as a whole, and each publisher individually for his contribution to the total saving and for a job well done. You have recognized the fact that there was not enough paper available to meet the increased wartime demand for your publications, and you have adjusted yourselves to the shortage. It is the same combination of ingenuity and co-operation which is accomplishing our war job."

However, still further restrictions are necessitated by the continuing shortage of pulpwood and wood pulp, and effective January 1, we are requested to effect a further reduction of 15 per cent, bringing the total reduction from 1942 use to 25 per cent. This is a drastic cut. It cannot be met easily. But we will meet it, for the situation demands it. As one measure, this and succeeding issues will be printed on a 40 lb. English-finish sheet (instead of the 45 lb. English-finish sheet used in recent issues and the 50 lb. supercalendered sheet used prior thereto). You will find that it is not as opaque and that it does not have the "body" of the paper used previously. However, we feel that we are fortunate in securing as good results as these, under the necessity for making so large a reduction in our consumption, for we have not otherwise reduced the quality of our service to you, in number of editorial or advertising pages, or in other ways that would seriously impair the value of our service to you. And you have been surprisingly appreciative of the conditions confronting us for we have not received a single complaint from you.

And while I am telling you of our measures to conserve paper, it will not be amiss to remind you that the responsibility is mutual. Every user of paper --every railway and railway supply manufacturer and every individual employed thereby--can help. Only through the co-operation of all can the limited supply of pulp be made to meet the needs of all, including the continued distribution to you of your copy of Railway Engineering and Maintenance from month to month.

Yours sincerely,

Elmer T. Howson

ETH:kw

Editor

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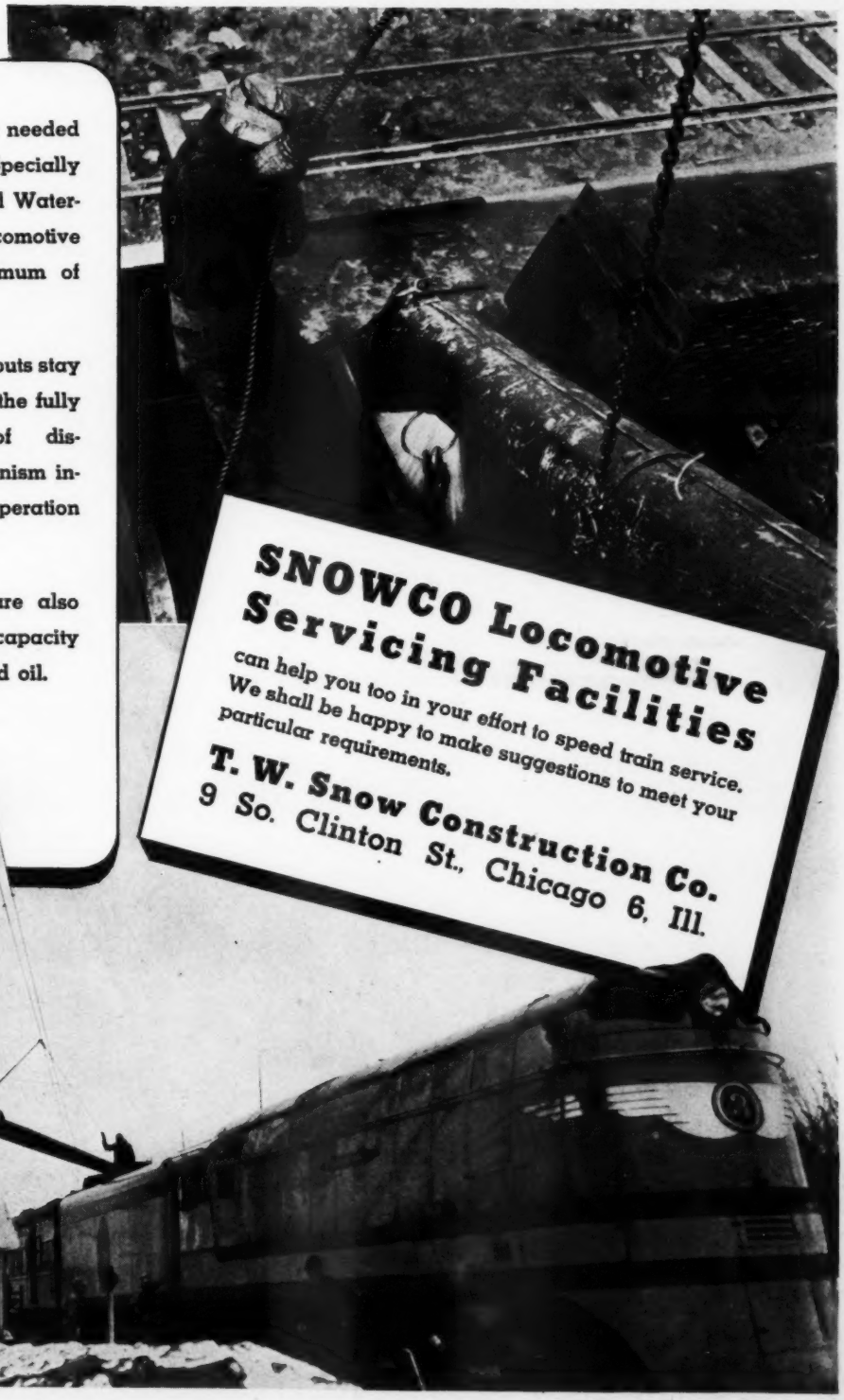

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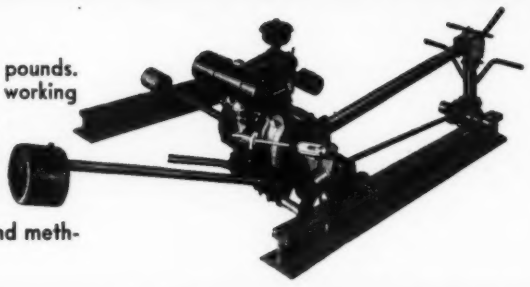

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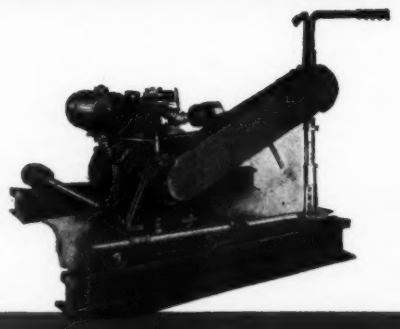

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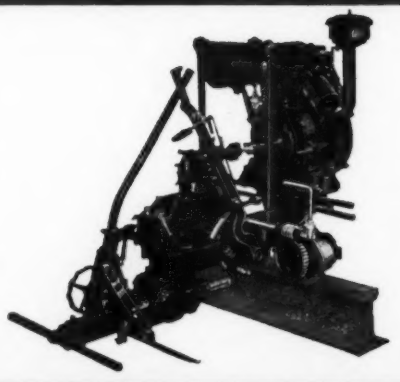

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Railway Engineering and Maintenance

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JANUARY, 1944

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Railway Engineering and Maintenance

1943 In Review

Railways Again Establish New Records

The year 1943 was the most remarkable in the history of the American railways for it demonstrated their indispensability to the nation's welfare more conclusively than ever before. In spite of the fact that they were put to a test far exceeding any previously experienced, they met all demands in a manner that won widespread commendation.

Among the indices of this achievement are the following, compiled largely by Dr. Julius H. Parmelee, director of the Bureau of Railway Economics of the Association of American Railroads.

The traffic handled again established new high records. Freight traffic, measured in ton miles, exceeded that for 1942 by 13.6 per cent; it was 53 per cent more than 1941; it surpassed the total for the pre-war peak traffic year of 1929 by 62 per cent and for the peak year of the last war, 1918, by 80 per cent. Passenger traffic (passenger miles) was 58 per cent heavier than in 1942; it exceeded that of 1941 by 190 per cent, topped the all-time previous record year of 1920 by 81 per cent and was double that of 1918.

Operating revenues likewise established new high levels. For the 12 months ending October 31, 1943, they totaled $8,904,000,000, as compared with $7,466,000,000 for the calendar year 1942 and slightly more than 6¼ billion dollars in the previous record year of 1929.

As is to be expected in a war year, railway taxes reached new heights, both relatively and in totals. In the 12 months ended October 31, 1943, they approximated $1,805,000,000, more than 50 per cent over the total for the calendar year 1942. In 1939 they aggregated only $355,677,558. Taxes took 20 cents of every dollar of revenues in 1943, as compared with 16.1 cents in 1942 and 8.9 cents in 1939.

New railway operating income (for the year ending October 31, 1943) reached the new high level of $1,511,849,000, as compared with $1,484,519,000 in 1942 and $1,251,698,000 in 1929. Only in the last two years has the rate of return exceeded 4 per cent since 1929.

Operating Indices

Never before have the railways demonstrated greater efficiency, as is shown by the following comparisons of performance for the first ten months of 1943 with those of previous calendar years.

Gross ton miles per train hour averaged 36,079, as compared with 35,510 in 1942; they were more than twice the 16,764 total for 1923.

The average mileage made per active freight locomotive reached 125.0, as contrasted with 122.4 in 1942 and 81.6 in 1923. Corresponding figures for passenger locomotives were 220.3 miles in 1943, as compared with 206.8 miles in 1942 and 142.4 in 1923. Freight car utilization also reached a new high of 52.3 miles per day per active unit, as contrasted with 50.3 miles in 1942 and 31.2 miles twenty years ago.

The average load per freight car rose to 33.5 tons in 1943, 1.7 tons more than in the preceding year and 5.6 tons more than in 1923. The average gross tons per freight train crossed 1100 for the first time in 1943 to reach the total of 1116; an increase of 81 tons over 1942 and of 403 tons over 1923. In no year prior to 1939 did this figure exceed 804 tons. The average passenger train load increased from 57.6 passengers in 1939 and 60.3 in 1940 to 186.2 passengers in 1943.

This record is one in which every railway employee can take justifiable pride. It demonstrates a contribution to the nation's war effort that is not excelled by any other industry.

1943 In Maintenance—

A Year of Violent Changes

IN no year within the experience of the present generation have greater versatility and adaptability been demanded of engineering and maintenance forces than in 1943; and in no year have they acquitted themselves with greater credit. The last twelve months have comprised a period of most exacting demands—they have also been a period of record wear and tear on the tracks and structures. Materials have been available only in quantities far short of needs, and in the closing months of the year, the shortage in labor became increasingly acute. All in all, the year has been one of extreme difficulty for maintenance men; yet, it has been one of great accomplishment, for the roadway facilities have met in full the demands made on them.

Construction

In no phase of railway activities has the influence of the war been more pronounced than in the construction and reconstruction of railway facilities. As a result of the scarcity of so many materials, work has been limited to such projects as are necessary to the war effort. Yet the number and the magnitude of the projects undertaken reflect anew the fact that the railways must constantly adapt their facilities to the changing demands of traffic.

Thus, the large expenditures for facilities necessary to serve new armament plants and troop training centers that so largely dominated the railway construction programs in 1941 and 1942, have drawn to a close. In their place has arisen a wide variety of projects to increase capacity and eliminate bottlenecks. Nearly ten million dollars were spent to eliminate tight spots in engine terminal capacity while more than twenty million dollars were spent for improved yard facilities. More multiple main tracks were built in 1943 than in any recent year, (144 miles as compared with 24 miles in 1942), all on lines carrying greatly increased wartime traffic.

New line construction completed totaled 56 miles, or 18 miles less than in 1942, although more than 80 miles of additional lines were under construction at the end of the year. The mileage completed last year was composed of 8 short extensions, the longest of which was only 11.64 miles. Only 3 miles of new lines and a smaller mileage of multiple main tracks were built in Canada, all in connection with the new terminal of the Canadian National at Montreal.

Turning from construction, 1096 miles of lines were abandoned in 1943; this compares with 2516 miles abandoned in the preceding year. It is the smallest mileage abandoned in any year since 1931 and indicates that the conditions which have led to the taking up of 30,333 miles of lines during the last 27 years may now be receding. Incidentally, in this perid, the abandonments have exceeded the lines built by 19,600 miles.

Maintenance Activities

In reviewing the year's activities in maintenance of way, one faces an anomalous situation. More money was spent for the repair of roadway and structures than in any previous year except the abnormal post federal control year of 1920. With figures for 10 months at hand, it appears that the total expenditures for maintenance of way will approximate $1,050,000,000. If from this figure are deducted the increased charges for depreciation that first became mandatory in 1943 ($87,922,926 for the first 10 months of last year, as contrasted with $33,440,160 in the same period of 1942) and if further relatively small amounts are deducted for amortization of wartime expenditures and for deferred maintenance taken into the accounts, the amount actually spent will still approach closely to one billion dollars. This total exceeded that of 1942 by approximately 200 million dollars, or 25 per cent. It is more than twice the amount spent in any of the years 1932-1940. It is three times the depression low of 1933.

Maintenance Expenditures 1917-1943

1917	$ 442,108,862	1930	$ 705,470,940
1918	649,794,953	1931	530,612,890
1919	772,186,045	1932	351,179,041
1920	1,032,540,381	1933	322,335,022
1921	756,413,690	1934	365,285,353
1922	728,663,534	1935	393,642,261
1923	813,688,760	1936	454,842,407
1924	792,678,023	1937	495,593,913
1925	816,443,205	1938	420,147,125
1926	866,819,365	1939	466,830,844
1927	868,581,432	1940	497,031,272
1928	837,905,747	1941	603,088,381
1929	855,354,867	1942	796,357,981
		1943	1,050,000,000*

*Last two months estimated.

Expenditures of such record magnitude would appear to be sufficient to maintain the fixed properties of the railways adequately. Yet the fact exists that these facilities are now in definitely poorer condition than at the beginning of 1943. This is due to a number of causes.

In the first place, this increased expenditure of 25 per cent for maintenance was offset in part at least by the large increase in traffic handled, with its corresponding increase in the wear and tear to be made good. Higher costs of materials and of labor, and especially the inexperience and increased inefficiency of the forces that were available, added greatly to the cost of such work as was done. As a result of all these influences, the amount of constructive maintenance work done during the year, large though it was, was insufficient to overcome the deterioration and the roadway and structures as a whole are now definitely in poorer condition than a year ago. This situation is all the more disconcerting when one recalls the large amount of undermaintenance that accumulated during the depression years of 1931-1940 and the fact that this deficiency was overcome only in part during 1941-42.

This condition has been accentuated during the year by the dislocation of traffic that has grown out of the war and the transfer to many lines of volumes of traffic far exceeding any previously experienced on those lines. Such developments have placed unexpected and heavy burdens on maintenance forces in extending passing tracks, enlarging water and coaling facilities, rehabilitating hitherto little-used tracks, etc.

The year's activities have been characterized also by markedly unbalanced programs. Confronted in many quarters by shortages of materials that made normal replacements impossible, the roads turned to such work as bank widening, ballasting and drainage in more than normal volume to get it out of the way of other work which it will be necessary to do in enlarged volume when the needed materials are again available.

Another factor contributing to distorted programs was the wide variation in the adequacy of labor in different areas. Especially in and near the larger industrial centers engaged in the production of military supplies, the roads encountered increasing difficulty in maintaining forces as the season advanced and in these areas the

amount of work completed was determined by the forces available. In other areas, the shortage was less acute or non-existent but the reluctance of men resident in these areas to go far from home resulted in the completion of more than the average programs in these areas. All in all, the year has been one of constant adaptation to changing conditions, with the rewards going to those roads whose supervisory officers showed the greatest alertness and versatility.

Rail

In materials used in the maintenance of roadway, rail continues to be the Number 1 problem; in fact, it holds this rank among all railway materials. In 1942, the railways, placed their minimum needs at 1,632,000 net tons; they received and laid 1,192,225 tons. In 1943 they asked for 2,100,000 tons and were allotted 1,527,000 net tons, of which it is estimated that they were able to lay in track 1,340,000 tons before the year ended. They have thus fallen short of making good current wear and tear by a million tons during the last two years. When it is recalled that the roads entered 1942 with an estimated deficiency in rail renewals of 3,000,000 tons accumulated during the depression years of restricted earnings and equally restricted expenditures for maintenance, it is not surprising that the number of rail failures and the number of train accidents resulting therefrom reached new high levels, for recent years at least, during 1943, and this situation will not improve until new rail becomes available in sufficient quantities to more than offset the wear of the record traffic now being handled. The rail condition is not conducive to peace of mind; on the contrary, it is alarming and calls for prompt correction.

Rail Applied in Renewals—Class I Roads

	Gross Tons		Gross Tons
1925	1,950,146	1934	631,093
1926	2,209,873	1935	582,794
1927	2,124,765	1936	921,298
1928	2,080,277	1937	1,029,861
1929	1,958,489	1938	599,752
1930	1,517,002	1939	878,643
1931	984,900	1940	998,914
1932	394,536	1941	1,197,593
1933	403,254	1942	1,192,225
		1943	1,340,000*

*Estimated

Crossties

The situation with respect to crossties was more satisfactory during 1943, although the outlook for 1944 is as least as discouraging as for rail. Owing to the lag between the time when a tie is produced and when it is inserted in the track, the renewals made in 1943 came from 1941 and 1942 production before the shortage in labor reduced the output seriously. As a result the railways renewed approximately 46,000,000 ties in 1943, a number not sufficient to make good the destruction of the year but not adding greatly to the accumulated deficiency of the depression years, which we have placed at 90,000,000 ties, or two full years of renewals.

The outlook for 1944 is far less reassuring, for labor has not been available to maintain production in the woods and as a result fewer ties have gone into the seasoning yards of the railways and commercial tie companies. It is evident, therefore, that the railways face a dearth of ties for replacements in 1944 and this in turn will contribute to a further weakening of the track structure.

Entering the year with materials constituting the Number 1 problem, labor usurped the position of primary concern as the year advanced. Facing the necessity for maintaining tracks and structures in condition to carry the heaviest traffic in their history, and with earnings sufficient to finance all justifiable expenditures for the first time in more than a decade, maintenance officers were confronted throughout the year with inability to secure the materials needed for such programs, and later in the year with inability to secure sufficient labor to install all of the limited allotments of materials that they were able to get.

For the country as a whole, maintenance of way forces averaged 5.1 per cent larger than in 1942; this increase compared with 6.6 per cent for all departments of the railways. This reflects the difficulty encountered by maintenance officers in securing the men they needed. This situation is demonstrated further by analysis of the personal needs of the railways, compiled by the Railway Retirement Board, which totaled 103,408 persons on November 1, of which 54,470 or 52.8 per cent, were for maintenance of way.

Furthermore, as is inevitable in times of acute shortages of labor, turnover increased greatly and labor became more and more inefficient. As a result, the output of constructive work secured per man hour and per dollar expended reached new lows.

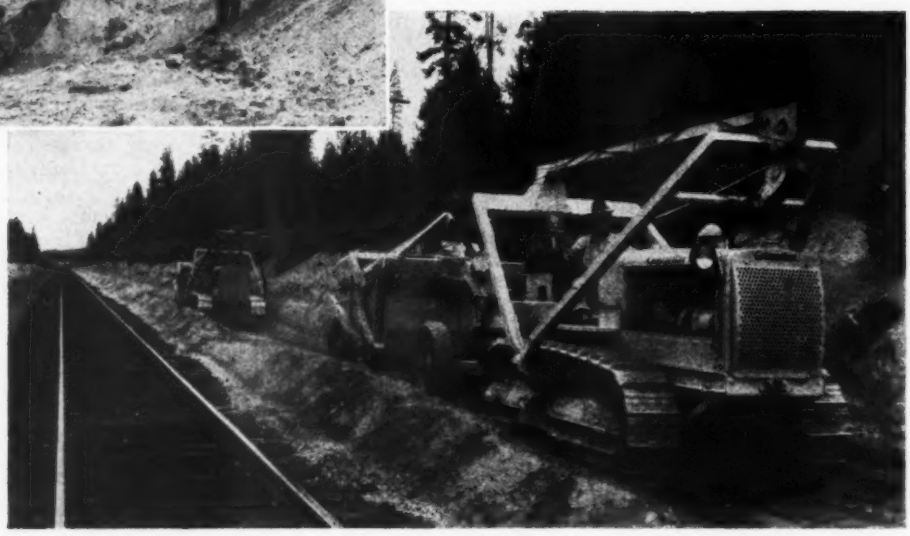
In efforts to offset this situation, maintenance officers on numerous roads showed a high degree of ingenuity in developing new sources of labor supply. Several roads secured marked relief through the employment of high school boys; one road gained much help through the enlistment of school teachers, clerks and others for week-end service; some slight assistance was secured from the recruiting of women for certain tasks, such as cleaning up the right of way. Most helpful, however, was the importation of several thousand Mexicans, who were distributed primarily on the railways of the southwest and, in the closing weeks of the year, were reaching some of the roads in the central and eastern states.

As in previous years, however, greatest assistance in this direction has come from the steadily growing use of mechanical equipment. Here the progress was more encouraging, for the roads purchased and placed in service more work equipment in 1943 than in any previous year, measured both in number of units and in expenditures therefore. Specifically, the roads bought approximately 8500 units of work equipment for maintenance of way operations last year, for which they expended more than $12,300,000, as set forth more specifically on a following page in this issue. These figures compare with 7612 units and $10,270,000 in 1942 and 8007 units and $10,500,000 in 1941. By this increasing utilization of work equipment, the roads were able to increase the output of work from such limited forces as were available and are also making the work more attractive to the men they have and thereby aiding in retaining them in service.

The New Year?

The year that has just closed has been an unusually difficult year for maintenance forces. The new year bids fair to be equally so. With a continuation and probable further intensification of traffic, the wear and tear will continue at record levels. Materials give promise of continuing critical, with growing scarcities in some, such as timber, offsetting improvement in others, particularly steel. Labor bids fair to become still more critical. These and other difficulties that will develop from day to day will require the continuation of a high degree of versatility and adaptability to "keep first things first" in order that the roadway and structures may continue successfully to carry for the duration the nation's military and civilian traffic safely and expeditiously.

Railways Spent $12,300,000 for



A Large Amount of Grading Equipment, Including Carryall Scrapers, Bulldozers, Draglines, Blade Graders, etc., Were Ordered

SURPRISINGLY, in view of the severe restrictions that were of necessity imposed on the use of many of the materials that are needed vitally and in large volume by the army and navy, and in further view of the widespread dislocation of manufacturing facilities to further the war effort, the railways of the United States and Canada purchased more work equipment in 1943 than in any previous year. Last year, the purchases of power machines and tools reached an all-time record of 8,507 units, the nearest approach to this figure having been in 1941, when 8,007 units were purchased.

At the beginning of the year, maintenance officers were faced with an acute shortage of labor which grew progressively more severe month by month as the working season advanced, except in June, during which month there was a slight gain in employment by reason of the large number of high-school boys who became available as the schools closed for the summer, and also through the importation of a considerable number of laborers from Mexico.

While many expedients were tried in an effort to increase employment, none of them were sufficient to stop the downward trend which, with the one exception mentioned, continued to the end of the year. Added to the difficulties thus created, much of the labor which could be obtained was definitely less efficient than the experienced and well-trained forces which had been available in previous years, so that the real shortage was greater than the apparent shortage. At the same time, the demands which were being made on the track and structures by an extraordinary traffic demanded more intensive maintenance of these facilities.

No Other Alternative

With these conditions confronting them, maintenance officers had no other alternative than to rely on further mechanization of their operations as an offset to the man-power they could not obtain. Fortunately, they already possessed a large number of power machines and power tools which had been acquired in recent years, but, as has been pointed out many times in these columns, no road had sufficient work equipment to meet all of its needs, even in normal times. For this reason, in the situation that confronted them at the beginning of the year, many were woefully short of the number of units they should have had.

However, the War Production Board was cognizant of the extreme need for power machines and tools, and was inclined to be helpful. On their part, the railways presented their case so convincingly that, while all of their requirements were not met, priorities were issued to cover the equipment that was most essential. The fact that the roads were able to convince the War Production Board that they needed this number of units is a clear indication of the recognized value of the mechanization of maintenance operations and of the ability of power machines, in part, to take the place of man-power in the present labor emergency.

Need Still More Machines

That labor will become increasingly difficult to obtain in the months ahead is foreseen by most officers and, although not all of them have completed their budgets for 1944, enough of them have done so to indicate that the roads as a whole are planning to buy more power machines next year than they did in 1943. In fact, because of the uncertainty of deliveries, a number of roads have already placed orders for all or part of the equipment they expect to need in 1944.

Not all of the machines purchased

Work Equipment in 1943

To Offset Acute Labor Shortage

Despite Severe Restrictions on Procurement of Materials, 130 Roads Purchased 8,507 Power Machines and Power Tools. Budgets for 1944 Contemplate Still Larger Purchases to Insure Needed War-Time Maintenance

last year were obtained directly from manufacturers. With the completion of training camps, munition plants, arsenals and other military establishments and war industries, not a few contractors were left with equipment for which they had no immediate need. A number of roads were able, therefore, to supplement from this source the equipment that they were able to purchase new, and thus reduce the demand for critical materials. The purchases of second-hand equipment consisted generally of automobiles, motor trucks, crawler mounted cranes, grading equipment and other heavy units.

A study of the detailed lists of work equipment purchased by individual roads, which follow this discussion, will disclose that, in general, purchases were confined to those types that can be substituted in largest measure for hand labor and those that perform operations that cannot be done manually. In addition, many other types were also purchased, as is indicated by the fact that a total of 133 types are included in these lists.

While the purchase of 8,507 units of work equipment in any year would of itself be impressive, it becomes still more so when it is recalled that in the six years immediately preceding 1943, a total of 29,266 units were purchased. It should be understood, however, not all of these were in addition to the equipment already owned, for many of them were obtained to replace units that had become obsolete or that had been worn out by the intensive use to which they were subjected during the depression. On the other hand, while some of those that were purchased last year were obviously for the replacement of worn-out units, most of them were in the nature of additions, for only those machines that could not be continued in service safely were retired. It is estimated that the purchases made in 1943 bring the total railway investment in work equipment to $120,000,000.

Attitude Has Changed

From the beginning of the development of work equipment, certain officers have believed that its value as an aid to maintenance was grossly overrated. They were reluctant to invest in any except certain types which they recognized they must have, because they performed tasks that could not be done by hand. Although they did obtain other types, they never bought freely, but often said that they had all of the equipment they needed or for which they could foresee a need. A few other roads, which were in low-wage areas, could see no profit in mechanization and were also poorly equipped with power machines.

Today, the conditions have changed so completely that no evidence of this former reluctance can be discerned. It is convincing proof of the part that mechanization is now playing in maintenance and of the part that it is destined to play in the post-war era

3239 Motor Cars, 369 Trailers and 761 Push Cars Were Purchased in 1943, a Record Year for This Type of Equipment

that even those who were formerly most conservative in their viewpoints are now strong advocates of a wider use of mechanical appliances.

One of the important features that has always characterized both the production and use of work equipment, and which has exerted a powerful influence on the expansion of its use, is the manner in which manufacturers have striven constantly to improve their machines, both physically, to increase their dependability, and from the standpoint of operating ease and efficiency. They have endeavored also to adapt them to the new conditions that are constantly arising in maintenance. The results of these continuing efforts are apparent in the number of machines and tools that have been redesigned in whole or in part in recent years and in the important improvements that have been made in others.

Improvements to Continue

At present much of this activity has of necessity been suspended, partly because of prevailing restrictions on materials and partly because of preoccupation with war problems of various kinds. However, manufacturers and maintenance officers have both been alert to note weaknesses in existing designs which have become apparent through the intensive use to which the equipment is being subjected, and to consider the possibilities of still further improvements. It may be expected, therefore, that, with the cessation of hostilities, this progress in development will be resumed, perhaps at an accelerated rate.

To obtain the information that is given in detail on the following pages, inquiry was made of all of the railways in the United States, Canada and Mexico, concerning their purchases of work equipment. Replies were received from 455 roads representing 75 per cent of all of the railways in these three countries, including all but one Class I road in the United States and one in Canada. Of this number 133 roads reported purchases. While this is less than the 172 roads that reported purchases of work equipment in 1942, it was expected that many of the short-line roads that were not participating actively in the great increase in war traffic would remain out of the market during the year. However, the more important roads upon whom the burden of this traffic has been thrown have more than made up in the volume of their purchases for the decreased number of roads that have bought such equipment.

In the early days of the development of work equipment, obsolescence had no place in the thinking of maintenance officers. Once a machine was acquired it was used until it was worn out and unfit for further service. The reason for this was that the amount of work equipment in service was so inadequate that efficiency was not a factor in considering its replacement, and any new units that could be acquired were rated as additions. Today, obsolescence is being disregarded only because it is essential to keep every unit of mechanical equipment in service as long as it can be used effectively and safely to perform the necessary work regardless of any question of economy.

Motor Cars Break Record

An outstanding example of the passing of this point of view with respect to obsolescence is found in the purchases of motor cars during 1943, for motor cars are in universal use and, except for a small number of inspection cars and equally few heavy-duty cars for large gangs, such cars as are purchased from year to year are obviously for replacement. It is of special interest in this connection, therefore, that the purchases of motor cars in 1943 reached the record figure of 3,239, or 600 more than the previous high of 2,639 which were purchased in 1942. There was, however, a small increase in the number of heavy-duty cars for large gangs, indicating that despite the widespread and acute shortage of casual labor, some roads were able to employ more mobile gangs than they do customarily. There was also a slight increase in the number of heavy-duty section cars, indicating larger section gangs in those areas where this type of labor was obtainable. A total of 1,130 push cars and motor-car trailers were purchased last year, compared with 1,069 in 1942.

Manufacturers have feared, and some maintenance officers have believed, that the saturation point for work equipment was approaching and that further developments would be stifled by a lack of demand for new units. There are many indications, however, that this belief is erroneous and that this point lies so far in the future that it may never be reached. This is confirmed in part by the number of motor cars purchased in 1943, which was greater than in any previous year, and by the fact that they followed relatively large purchases in previous years. Motor cars have been used longer than all but a few types of equipment and their use is so nearly universal that they should have shown signs of saturation if any type should do so.

Tie tampers provide almost as good an example of the continuing need for mechanical aids in maintenance, for this equipment has not only been in use for more than a quarter century, but has been used more widely than any other type except motor cars. Furthermore, its value in track maintenance has been demonstrated so clearly that practically all roads have bought this equipment liberally for a number of years. Yet, the fact that the purchases of this equipment in 1943 amounted to 504 complete tie tamping outfits, ranging from 2 to 20 tools, and 284 tampers of the unit type, is a clear indication that the point of saturation for this equipment has not yet been approached. This is confirmed further by the fact that tie tampers constitute an important item in the work-equipment budgets for 1944 which have been completed.

In addition to the power plants that were included in the tie-tamping outfits, the electric-lighting plants, the paint-spraying outfits and the welding outfits, the railways bought 115 air compressors and 46 generators. While some of these power plants were intended as replacements for similar worn-out units, the majority were evidently purchased for the specific purpose of extending the use of small portable power tools, as is indicated by the fact that a large number of these tools were acquired during the year.

Again, the roads indicated their interest in earth-moving equipment, this being the fourth successive year that they have bought units of this

Much Attention Was Given to Weed Destruction Last Year

More Ballasting and General Surfacing Were Undertaken Than in Any Year Since 1929

class liberally. This indicates a continuation of their determination to strengthen the roadbed and improve drainage to insure stability of the track and roadbed, and thus insure against delay or interruption of present and future traffic. This is indicated by the purchase of 165 units of grading and trenching equipment during the year, which was 13 more than were purchased in 1942, 83 more than in 1941 and 73 more than in 1940. Included in this total were 34 angle dozers and bulldozers, 28 carryalls and large-capacity scrapers, 8 graders, 11 draglines, 5 dragline and shovel attachments for tractors, 9 power shovels, 1 spreader ditcher and 36 buckets of various types for excavating. Other units included road rollers, rooters, dump trucks, embankment shapers and ditching machines for mounting on flat cars. As might have been expected, in view of the present density and speed of traffic, brought on by the demands of wartime, all of the mobile units were off-track designs, except the spreader ditcher and the car-top ditchers.

One of the major tasks of the maintenance forces during the year was the installation of the larger tonnage of new rail that was released to them during 1943, and the placing of much of the released rail in secondary lines. In preparation for this work, 513 units of rail-laying equipment were purchased, including spike pullers, bolt tighteners, adzing machines, creosote sprayers, rail cranes, rail and bonding drills, spike drivers and rail grinders. While some of these units were for replacement purposes, the majority of them represented additions to existing equipment.

More ballasting and general surfacing without the application of ballast was done in 1943 than in any year since 1929. For this work, in addition to the tie tampers which have been mentioned, and 162 tie-tamping tools, 40 units of surfacing equipment, including power jacks, power ballasters and ballast cleaners were purchased during the year.

Destroy More Weeds

Owing to both the shortage of labor and the increasing density of traffic, it became necessary to defer some work that was not essential to the moving of traffic. However, having in mind the appearance of the track and right of way during the depth of the depression and the task that was involved in cleaning them up after increased revenue made it possible to do so, weed destruction was considered to be one of the important items of maintenance on most roads. To avoid the accumulation of vegetation that had been allowed to grow during the lean years, and to continue the work of policing the property that has been going on for several years, the railways purchased 137 weed-destroying units in 1943. These included track-mounted and off-track mowing machines, tractor mowers, power mowers, discers, scarifiers and weed burners.

Following the almost complete closing of the market for highway vehicles at the outset of the war, there was a corresponding slump in the purchase of this equipment by the railways. However, with the increase in traffic handled by the railways and the further curtailment of local trains, it has been almost impossible to get men and materials to many points without resort to highway transportation. On this showing, the railways were allowed to purchase 239 vehicles in 1942. In 1943, through the purchase of such new vehicles as could be obtained, supplemented by a few second-hand motor trucks and passenger cars, the roads obtained 273 units, including 181 trucks, 91 automobiles, station wagons and buses and 1 trailer.

As was expected, the number of cranes purchased in 1943 was somewhat less than in 1942, the number being 61 compared with 73 in the previous year. In addition to these, however, 9 truck-mounted cranes and 26 derrick cars of the push-car type were purchased. Of the cranes, 25 were for laying rail and 16 were of the locomotive type. The remainder ranged in size from 2½ to 10 tons. So far as can be determined, all but the rail cranes were on crawler mountings for off-track use.

Other Items Purchased

Among the important purchases that have not been mentioned, the purchases in 1943 included 56 concrete mixers and 14 concrete vibrators, 5 engines to replace worn out engines in existing equipment, 13 paint-spraying outfits, 68 portable pumps, 80 rail saws, 40 welding outfits, 25 power hoists of various kinds, 2 outfit cars equipped with wood-working machinery, 10 steam hammers, 5 snow plows and 13 tractor-mounted snow plows, 17 large-capacity power-operated bridge jacks and 133 motor-car engines. Other devices, whose use has been increasing in recent years are rail and flange lubricators. The purchase of 660 units of this equipment, a considerable number of which were the two-rail type, compares with 545 in 1942, and indicates an increasing interest in the conservation of rail under today's extraordinary traffic. In addition to the items listed and included in the total of 8,507 units, the Reading reported that it had purchased 3,778 unit switch heaters.

A review of the number of units of work equipment purchased year by year since 1937, the first year for which this information was recorded, is of interest as showing the extent of the expansion which has occurred in the mechanization of maintenance operations in recent years. The number of units purchased year by year from 1937 to 1943 inclusive is as follows: 1937, 3,310 units; 1938, 1,376 units; 1939, 3,547 units; 1940, 5,414 units; 1941, 8,007 units; 1942, 7,612 units; and 1943, 8,507 units. Thus, a total of 37,773 units have been purchased during the last seven years, at a total cost of $53,500,000, bringing the total investment in this type of equipment to $120,000,000.

The stimulation that was given to the use of work equipment by the shortage of labor during the depression and the growing appreciation of its value, even with normal forces, is clearly discernible in the foregoing figures. The effect of the lessons learned during those lean years can be seen as clearly in the purchases for 1943, and this gives an understanding of the fact that the roads

are planning to buy still more liberally in 1944 in expectation that the existing labor shortage will become still more acute in the months that lie ahead.

A detailed list of all of the work equipment purchased in 1942 by all of the railways of the United States and Canada, except one Class I road in each of these countries, follows:

UNITED STATES

Akron & Barberton Belt
1 Motor car, inspection

Akron, Canton & Youngstown
2 Drills, rail
1 Motor car, section
1 Motor truck
6 Tie tampers, unit type

Alaska
1 Air compressor
1 Crane, locomotive
1 Crane, rail
1 Drill, heavy duty
6 Drills, rotary
1 Generator, battery charging
1 Generator, portable
1 Hammer, chipping
2 Hammers, riveting
1 Hammer, steam, pile
1 Hoist, hand
2 Hoists, jack
6 Motor cars, inspection
1 Motor car, heavy duty
1 Spreader
1 Tractor, crawler mounted
1 Welding outfit

Alton
3 Automobiles
2 Grinders, rail, portable
1 Pump, portable
1 Rail laying machine
2 Spike drivers
2 Spike pullers

Alton & Southern
1 Drill, rail
1 Motor truck

Angelina & Neches River
2 Motor cars, section

Apache
1 Automobile

Atchison, Topeka & Santa Fe
A-Atchison, Topeka & Santa Fe
45 Air compressors
2 Bolt tighteners
1 Concrete mixer
3 Cranes
2 Generators, portable
6 Grinders, rail mounted
26 Motor cars, inspection
30 Motor cars, section
30 Motor car engines
100 Motor car frames
49 Rail and flange lubricators
1 Spike puller
1 Tractor
115 Trailers, motor car
1 Weed burner
B-Gulf, Colorado & Santa Fe
2 Adzing machines
6 Air compressors
1 Crane
5 Motor cars, inspection
5 Motor cars, section
2 Motor car engines
20 Motor car frames
5 Rail and flange lubricators
25 Trailers, motor car
C-Panhandle & Santa Fe
2 Motor cars, inspection
2 Motor cars, section
10 Motor car engines
36 Motor car frames
10 Trailers, motor car

Atlanta & Saint Andrews Bay
1 Motor car, inspection
1 Motor car, section
8 Motor car engines
3 Push cars

Atlanta & West Point-Western Railway of Alabama
2 Motor cars, inspection
2 Motor cars, section
1 Motor truck
2 Tie tamping outfits
1 Weed burner

Atlanta, Birmingham & Coast
12 Motor cars, section
12 Push cars

Atlantic & East Carolina
1 Bolt tightener
3 Drills, rail
1 Motor car, inspection
5 Motor cars, section
1 Motor truck
1 Spike driver
1 Spike puller

Atlantic Coast Line
2 Adzing machines
1 Bolt tightener
1 Concrete mixer
1 Crane, rail
1 Drill, reversible
1 Saw, radial
3 Saws, chain
4 Spike drivers
2 Spike pullers
10 Tie tamping outfits

Bangor & Aroostook
1 Drill, bonding
1 Grinder, rail mounted
1 Motor car, inspection
3 Motor cars, section
1 Saw, rail

Belt Railway of Chicago
12 One-man track tools
24 Track liners

Bessemer & Lake Erie
5 Motor cars, inspection
1 Motor car, section
1 Trailer, motor car

Bingham & Garfield
1 Generator, portable
3 Rail and flange lubricators

Birmingham Southern
1 Motor car, section

Bonhomie & Hattiesburg Southern
2 Motor car engines

Boston & Maine
6 Adzing machines
2 Air compressors
1 Bolt tightener
1 Crane, locomotive
5 Derricks, portable
2 Discers
3 Drills, bonding
3 Drills, rail
2 Engines
5 Generators, portable
1 Grinder, portable
4 Grinders, rail, portable
4 Hammers, chipping
10 Hammers, electric
3 Hammers, riveting
8 Hammers, scaling
1 Hoist, air
4 Jackhamers
2 Jacks, power
24 Motor cars, inspection
40 Motor cars, section
10 Motor cars, heavy duty
1 Paint spraying outfit
4 Paving breakers
2 Pipes, pusher hydraulic
1 Pump, portable
1 Rivet cutter
5 Saws, circular
2 Snow plows
9 Snow plows, tractor mounted
4 Spike pullers
75 Tie tampers, unit type
1 Weed burner
4 Welding outfits
5 Wood borers

Buffalo Creek
1 Air compressor
1 Drill, rail
2 Spike drivers
1 Wrench, power

Central of Georgia
2 Adzing machines
1 Air compressor
1 Creosote sprayer
3 Derrick cars
1 Hammer, sheet pile
2 Motor cars, inspection
3 Motor cars, heavy duty
5 Rail and flange lubricators
1 Saw, rail
6 Tie tamping outfits
1 Tractor
11 Weed burners

Central of New Jersey
1 Adzing machine
1 Air compressor, s.h.
1 Bolt tightener
1 Drill, bonding
1 Extinguisher car
1 Motor car, heavy duty
1 Motor truck
2 Pumps, portable
7 Rail and flange lubricators
1 Saw, rail
2 Spike pullers
1 Weed burner
2 Welding outfits

Charleston & Western Carolina
10 Rail and flange lubricators

Chesapeake & Ohio
6 Adzing machines
3 Air compressors
12 Automobiles
2 Ballast cleaners
6 Bolt tighteners
2 Buckets, coal handling
2 Car spotters
2 Cleaners, vapor spray
2 Concrete mixers
1 Crane, locomotive
2 Grinders, rail, portable
2 Hoists, chain
15 Motor cars, inspection
59 Motor cars, section
7 Motor cars, heavy duty
2 Motor trucks
1 Paving breaker
3 Pumps, portable
21 Rail and flange lubricators
4 Spike pullers
12 Welding outfits

Chicago & Eastern Illinois
2 Cranes, second hand
14 One-man track tools
1 Saw, circular

Chicago & North Western Lines
A-Chicago & North Western
1 Discer
2 Drills, rail
3 Grinders, portable
69 Motor cars, inspection
91 Motor cars, section
6 Motor cars, heavy duty
7 Motor trucks
4 Mowers, power
14 Rail and flange lubricators
1 Sewer cleaning machine
1 Tie tamping outfit
B-Chicago, St. Paul, Minneapolis & Omaha
16 Motor cars, inspection

71 Motor cars, section
2 Rail and flange lubricators

Chicago & Western Indiana
2 Hand cars
6 One-man track tools
3 Push cars
12 Track liners

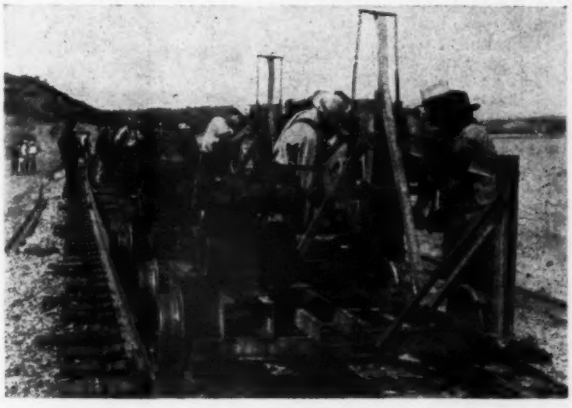
Chicago, Burlington & Quincy
A-Chicago, Burlington & Quincy
2 Adzing machines
1 Air compressor
9 Automobiles
2 Bolt tighteners
1 Bucket, clamshell
2 Buckets, dragline
1 Concrete mixer
2 Demolition tools
6 Derrick cars
2 Discers
1 Dragline
1 Drill, bonding
1 Drill, rock
3 Drills, rail
1 Earth borer
2 Generators, portable s.h.
5 Grinders, rail
5 Hammers, rivet
2 Jacks, bridge
56 Motor cars, inspection
157 Motor cars, section
2 Motor cars, heavy duty
3 Motor trucks
3 Mowing machines
2 Power units, portable
5 Pumps, portable
10 Rail and flange lubricators
1 Jam riveter
17 Tie pullers
24 Tie tamping outfits
1 Tractor
2 Weed burners
2 Wood borers
1 Wrench, impact
B-Colorado & Southern
3 Automobiles
1 Bolt tightener
1 Crane, locomotive
3 Motor cars, inspection
15 Motor cars, section
3 Motor cars, heavy duty
4 Motor trucks
1 Mowing machine
8 Rail and flange lubricators
1 Shovel, power
1 Tie tamping outfit
2 Tractors
10 Trailers, motor car
1 Weed burner
C-Ft. Worth & Denver City
1 Crane, locomotive
1 Dragline
1 Drill, rail
1 Extinguisher car
2 Grinders, rail, portable
5 Motor cars, inspection
14 Motor cars, section
4 Motor cars, heavy duty
1 Mowing machine
2 Rail and flange lubricators
1 Tractor
1 Weed burner

Chicago Great Western
3 Motor cars, inspection
1 Motor car, section
1 Motor car, heavy duty

Chicago, Indianapolis & Louisville
3 Motor cars, inspection
12 Motor cars, section
2 Motor cars, heavy duty

Chicago, Milwaukee, St. Paul & Pacific
2 Air compressors
4 Drills, rail
34 Motor cars, inspection
150 Motor cars, section
12 Motor cars, heavy duty
2 Saws, rail
1 Shovel, power s.h.
4 Spike drivers
8 Tie tamping outfits
20 Trailers, motor car

Chicago, Rock Island & Pacific
1 Automobile
2 Buckets, clamshell
1 Concrete mixer
1 Concrete vibrator
2 Drills, rail
2 Grinders, rail, portable
35 Motor cars, inspection
70 Motor cars, section
7 Motor cars, heavy duty
3 Motor trucks
1 Mowing machine, tractor type
2 Power mowers
1 Paint spraying outfit
4 Saws, circular



Machines for Laying Rail Were Important Items in the 1943 Budgets

8 Tie tamping outfits
1 Weed burner

Clarendon & Pittsford
1 Motor car

Clinchfield
1 Concrete mixer-s.h.
8 Tie tampers, unit type

Colorado & Wyoming
1 Tie tamper, unit type

Columbus & Greenville
1 Automobile
1 Dragline
1 Motor car, inspection
1 Motor truck
1 Saw, circular

Cumberland & Pennsylvania
2 Motor cars, section

Danville & Western
4 Rail and flange lubricators

Delaware & Hudson
3 Bolt tighteners
1 Bulldozer
1 Crane, rail
3 Drills, rail
7 Dump bodies for push cars
1 Hoist for tractor
1 Jack, power
1 Motor car, inspection
5 Motor cars, section
4 Spike drivers
6 Tie tampers, unit type
9 Tie tamping outfits
1 Tractor
1 Welding outfit
4 Wrenches, impact

Denver & Rio Grande Western
2 Concrete mixers
1 Crane, locomotive
2 Drills, rail
2 Drills, bonding
3 Motor cars, inspection
3 Motor cars, section
4 Motor cars, heavy duty
13 Motor trucks
1 Pipe pusher
3 Pumps, portable
42 Tie tampers, unit type
1 Tractor

Detroit & Toledo Shore Line
1 Push car

Detroit, Toledo & Ironton
1 Adzing machine
4 Jacks, surfacing and lining
4 Motor cars, section
2 Motor car engines
2 Mowers, power
2 Rail and flange lubricators
8 Tie tampers, unit type

Duluth & Northeastern
1 Discer

Duluth, Missabe & Iron Range
7 Motor cars, section

Elgin, Joliet & Eastern
2 Automobiles
1 Belt sander
2 Hoists
4 Motor cars, inspection
12 Motor cars, section
7 Motor cars, heavy duty
1 Paving breaker
1 Wood borer
1 Wrench, impact

Erie
1 Drill, rail
1 Floor scrubbing machine
2 Generators, portable
2 Grinders, rail, portable
1 Hammer, portable electric
4 Jacks, power bridge
22 Motor cars, inspection
26 Motor cars, section
5 Motor cars, heavy duty
3 Pumps, portable
34 Rail and flange lubricators
1 Saw, circular
2 Saws, rail
4 Tie tamping outfits
1 Weed burner

Escanaba & Lake Superior
1 Motor car, section

Etna & Montrose
1 Motor car, heavy duty

Florida East Coast
2 Bolt tighteners
1 Bullgrader
1 Crane, rail
2 Motor cars, inspection
10 Motor cars, heavy duty
2 Saws, rail

5 Tie tamping outfits
1 Tractor

Galesburg & Great Eastern
1 Motor car, heavy duty
1 Shovel, power

Georgia & Florida
3 Motor cars, inspection
1 Motor car, section
8 Motor car engines

Georgia
1 Derrick car
2 Motor cars, inspection
3 Motor cars, section
1 Motor truck
3 Rail and flange lubricators
2 Tie tamping outfits

Great Northern
3 Air compressors
1 Angle dozer
5 Automobiles
1 Backfill tamper
3 Ballasters, power
3 Blade graders
4 Bolt tighteners
6 Bulldozers
2 Buses, s.h.
3 Concrete vibrators
1 Crane, rail
1 Crane, tractor
1 Discer
10 Derrick cars
10 Drills, electric
3 Drills, rail
14 Generators, portable
1 Generator, welding
1 Grinder for chain saw blade
3 Grinders, electric
3 Grinders, rail, rail mounted
3 Hoists, hand
2 Jackhamers
71 Motor cars, inspection
74 Motor cars, section
29 Motor cars, heavy duty
15 Motor trucks
1 Mower, tractor type
2 Mowing machines
1 Pump, portable
51 Rail and flange lubricators
4 Saws, rail
10 Saws, timber
6 Scrapers
1 Sheeting driver
1 Spike driver
1 Spike puller
2 Steam boilers, portable
6 Tie cutters
32 Tie tamping outfits
7 Tractors
11 Trailers for caterpillar cranes
39 Trailers, motor car
2 Weed burners

Great Western
1 Motor car, inspection
1 Motor car, section
1 Motor car, heavy duty
1 Mowing machine
1 Tractor

Green Bay & Western
1 Crane, truck mounted
4 Motor cars, inspection
2 Motor cars, section
1 Pump, portable

Gulf, Mobile & Ohio
6 Motor cars, inspection
15 Motor cars, section

Houston Belt & Terminal
1 Drill, rail
1 Saw, rail
2 Tractors

Illinois Central
2 Adzing machines
2 Air compressors
2 Bolt tighteners
2 Cranes, rail
2 Discers
1 Dragline
2 Drills, bonding
2 Drills, rail
1 Grinder, rail, rail mounted
14 Motor cars, inspection
30 Motor cars, section
6 Motor cars, heavy duty
3 Pumps, portable
75 Rail and flange lubricators
4 Spike pullers
52 Tie tampers, unit type
20 Tie tamping outfits

Illinois Terminal
1 Motor car, inspection
6 Motor cars, section
1 Motor car, heavy duty
1 Motor car engine
2 Push cars

Indianapolis Union
1 Motor car, heavy duty

Kansas City Southern
A-Kansas City Southern
1 Adzing machine
2 Bolt tighteners
1 Discer
10 Motor cars, inspection
15 Motor cars, section
13 Motor cars, heavy duty
4 Mowing machines
24 Push cars
10 Tie tamping outfits
24 Trailers
B-Louisiana & Arkansas
3 Adzing machines
6 Automobiles
2 Bolt tighteners
1 Discer
10 Motor cars, inspection
34 Motor cars, section
12 Tie tamping outfits
48 Trailers, motor car

Lake Superior & Ishpeming
2 Motor cars, section

Lehigh & Hudson River
1 Bolt tightener
1 Drill, rail
1 Motor car, section
1 Pump, portable
3 Push cars
2 Tie tamping outfits

Lehigh & New England
2 Motor cars, section
1 Motor car, heavy duty

Lehigh Valley
4 Ballast cleaning machines
4 Drills, bonding
1 Generator, portable
36 Motor cars, section
10 Motor cars, heavy duty
1 Motor car engine
7 Motor trucks
1 Pump, portable
9 Push cars
12 Spike drivers
7 Tie tamping outfits
1 Weed burner

Louisville & Nashville
1 Adzing machine
1 Crane, rail
1 Discer
1 Ditching machine, tractor mounted
1 Dragline bucket
6 Drills, rail
8 Grinders
3 Grinders, rail, portable
2 Hammers, steam
10 Jackhamers
16 Motor cars, inspection
27 Motor cars, heavy duty
4 Paving breakers
6 Pumps, portable
1 Saw, chain
2 Spike drivers
8 Tie tampers, unit type
10 Tie tamping outfits
1 Tractor
1 Welding outfit
4 Wrenches, power

Macon, Dublin & Savannah
1 Bolt tightener
1 Grinder, rail, portable
5 Motor cars, section
1 Pump, portable
1 Welding outfit

Maine Central
3 Air compressors
1 Discer
1 Drill, rail
3 Drills, bonding
7 Hoists
4 Jackhamers
10 Motor cars, inspection
5 Motor cars, section
3 Motor cars, heavy duty
2 Motor trucks
1 Mowing machine
6 Push cars
2 Pumps, portable
17 Rail and flange lubricators
1 Snow plow, tractor mounted
3 Snow plows
4 Tie tampers, unit type
1 Tie tamping outfit
1 Tractor
1 Trailer, highway
3 Wood borers

Maryland & Pennsylvania
1 Motor car, section

Minneapolis & St. Louis
2 Automobiles
3 Motor cars, inspection
6 Motor cars, section
1 Motor truck
1 Paint spraying outfit, s.h.
6 Push cars

Minneapolis, St. Paul & Sault Ste. Marie
A-Minneapolis, St. Paul & Sault Ste. Marie
4 Motor cars, inspection
3 Motor cars, section
20 Motor car engines
1 Pump, portable
B-Duluth, South Shore & Atlantic
1 Air compressor
2 Motor cars, section
3 Paint spraying outfits

Missouri & Arkansas
1 Grinder, rail, portable
1 Motor car, inspection
1 Motor car engine
8 Push cars
1 Tractor mounted shovel

Missouri & Illinois Bridge & Belt
1 Motor car, section

Missouri-Kansas-Texas
4 Adzing machines
1 Concrete mixer
3 Cranes
2 Motor cars, inspection
42 Motor cars, section
1 Mowing machine
1 Tie tamping outfit

Missouri Pacific Lines
A-Missouri Pacific
1 Ballast drainage car
1 Bladegrader
1 Bolt tightener
3 Bulldozers
4 Concrete mixers
1 Concrete vibrator
1 Crane
1 Crane, s.h.
1 Discer
2 Generators, portable
12 Grinders, rail, portable
75 Motor cars, inspection
11 Motor cars, section
26 Motor cars, heavy duty
7 Motor car engines

22 Mowing machines, tractor type
2 Paving breakers
54 Rail and flange lubricators
4 Saws, circular
9 Scrapers
72 Tie tamping tools
1 Tractor, s.h.
6 Weed burners

B-Gulf Coast Lines
2 Angle dozers
1 Dragline
5 Mowing machines, tractor type
6 Tie tamping outfits
2 Tractors
2 Weed burners
1 Welding outfit

C-International-Great Northern
2 Angle dozers
1 Dragline
5 Mowing machines, tractor type
8 Tie tamping outfits
2 Tractors
3 Weed burners
1 Welding outfit

D-Missouri-Illinois
1 Bladegrader
1 Grinder, rail, portable
1 Motor car, inspection
4 Motor cars, section
3 Motor cars, heavy duty
1 Mowing machine, tractor type
1 Scraper
1 Tractor
1 Weed burner

Monongahela
1 Motor car, section
2 Tie tampers, unit type

Narragansett Pier
1 Motor car, section s.h.

Nashville, Chattanooga & St. Louis
2 Adzing machines
3 Air compressors
1 Bucket, clamshell
1 Bucket, dragline
6 Concrete mixers
6 Concrete vibrators
2 Cranes, locomotive
1 Grinder, rail, portable
1 Hammer, steam
15 Motor cars, inspection
30 Motor cars, section
2 Rail and flange lubricators
8 Tie tamping outfits
1 Welding outfit, portable

Nevada Northern
1 Automobile
1 Drill, pneumatic
1 Drill, reversible
1 Hoist, electric
1 Jack, power

New Orleans Public Belt
1 Tie tamping outfit

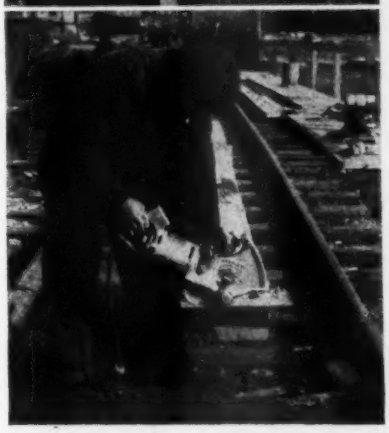
New York Central Lines

A-New York Central
7 Adzing machines
1 Angle dozer
1 Automobile
11 Bolt tighteners
1 Bulldozer
1 Crane, locomotive
3 Cranes, rail
4 Drills, rail
14 Grinders, rail, portable
1 Hammer, steam
44 Motor cars, inspection
36 Motor cars, section
26 Motor cars, heavy duty
15 Rail and flange lubricators
1 Saw, chain
10 Saws, rail
5 Spike pullers
4 Tie borers
37 Tie tamping outfits
2 Tractors
10 Trailers, motor car
2 Wrenches, impact

B-Boston & Albany
1 Crane, rail
1 Motor car, inspection
12 Motor cars, section
1 Motor car, heavy duty
1 Saw, rail
4 Tie borers

C-Chicago River & Indiana
1 Grinder rail, portable

D-Cleveland, Cincinnati, Chicago & St. Louis
1 Automobile
1 Bulldozer
2 Drills, bonding
1 Drill, electric
6 Drills, rail
1 Grinder, rail, portable
24 Motor cars, inspection
45 Motor cars, section



There Was a Large Increase in the Use of Portable Power Tools in 1943

7 Motor cars, heavy duty
3 Rail and flange lubricators
2 Saws, rail
37 Tie tamping outfits
1 Tractor

E-Indiana Harbor Belt
1 Drill, rail
1 Motor car, inspection
1 Paving breaker
1 Saw, rail

F-Michigan Central
2 Adzing machines
4 Bolt tighteners
1 Bulldozer
2 Concrete mixers
1 Crane, rail
1 Dragline and clamshell attachment for power shovel
4 Grinders, rail, portable
25 Motor cars, inspection
46 Motor cars, section
7 Motor cars, heavy duty
10 Motor trucks
3 Push cars
2 Shovels, power
6 Spike pullers
22 Tie tamping outfits

G-Peoria & Eastern
1 Adzing machine
1 Motor car, inspection
6 Motor cars, section
1 Motor car, heavy duty
2 Motor trucks

H-Pittsburgh & Lake Erie
1 Blade grader
1 Grinder, rail, portable
2 Motor cars, section
1 Motor truck
1 Tractor
2 Trailers, motor car

New York, Chicago & St. Louis
1 Blade grader
1 Bucket, clamshell
1 Crane
1 Double end rail loader
13 Motor cars, inspection
22 Motor cars, section
1 Motor car, heavy duty
3 Motor trucks
11 Tie tamping outfits
1 Tractor

New York, New Haven & Hartford
17 Automobiles
9 Buckets, clamshell
2 Bulldozers
1 Crane
1 Grinder, electric
2 Hammers, steam
20 Motor cars, inspection
7 Motor cars, section
25 Motor trucks
1 Paint spraying outfit
1 Power ballaster
1 Pump, portable
1 Saw, tilting table
2 Tractors
1 Welding outfit
1 Wrench, impact
1 Wrench, power

New York, Ontario & Western
2 Automobiles, s.h.
1 Concrete mixer
2 Cranes, truck-mounted
1 Hoist
4 Bridge jacks, pneumatic
1 Motor car, inspection
3 Motor cars, section
2 Motor car engines
1 Portable conveyor
1 Tractor
2 Welding outfits

Norfolk & Western
2 Adzing machines
1 Crane, rail
7 Motor cars, inspection
4 Motor cars, section
14 Rail and flange lubricators
1 Saw, rail
3 Spike pullers
5 Wrenches, power

Norfolk Southern
1 Derrick car
1 Drill, rail
1 Motor car, inspection
2 Motor cars, section
1 Saw, rail
2 Tie tamping outfits

Oregon & Northwestern
1 Automobile
1 Motor car, section
1 Motor car engine

Oregon, California & Eastern
1 Push car

Pennsylvania
4 Adzing machines
1 Air compressor
2 Bolt tighteners

4 Buckets, clamshell
2 Cranes, crawler mounted
4 Derrick, cars
9 Grinders, rail, portable
13 Motor trucks
1 Saw, pneumatic
2 Snow plows
3 Spike pullers
50 Tamping tools
38 Tie tampers, unit type
3 Welding outfits

Peoria & Pekin Union

1 Bucket, clamshell
1 Bucket, dragline
1 Crane, locomotive
1 Drill, rail
1 Jack, power
1 Motor car, heavy duty
1 Tie tamping outfit

Pere Marquette

1 Adzing machine
8 Air compressors
1 Automobile
1 Bolt tightener
1 Bucket, clamshell
2 Cranes, rail
1 Drill, rail
6 Motor cars, inspection
18 Motor cars, section
2 Motor cars, heavy duty
1 Mowing machine, tractor type
4 Saws, rail
2 Spike pullers
1 Tie borer
1 Tie tamping outfit
12 Trailers, motor car

Pittsburg, Shawmut & Northern

1 Bulldozer
1 Drill, steel
1 Tractor

Pittsburgh & Shawmut

1 Automobile
1 Portable conveyor
1 Pump, portable
4 Tie tampers, unit type
1 Tie tamping outfit

Pittsburgh & West Virginia

2 Motor cars, section

Pittsburgh, Chartiers & Youghiogheny

1 Motor truck

Quanah, Acme & Pacific

1 Motor car engine

Quincy

1 Paint spraying outfit

Reading

2 Adzing machines
2 Ballast cleaners, shoulder attachments
2 Bolt tighteners
2 Cranes, rail
1 Motor truck
25 Push cars
11 Rail and flange lubricators
2 Saws, rail
1 Spike puller
2 Weed burners

Richmond, Fredericksburg & Potomac

1 Air compressor
1 Drill, rail
1 Motor car, inspection
3 Motor cars, section
3 Motor cars, heavy duty
2 Motor car engines
1 Motor truck
12 Push cars
3 Rail and flange lubricators
2 Saws, rail
1 Spike puller
1 Tie tamper, unit type
2 Tie tamping outfits
1 Tractor

St. Louis-San Francisco

2 Adzing machines
3 Air compressors
4 Bolt tighteners
3 Concrete mixers
1 Concrete vibrator
2 Drills, electric
7 Drills, rail
2 Drills, rock
4 Generators, portable
4 Grinders, rail, rail-mounted
30 Motor cars, inspection
53 Motor cars, section
5 Motor cars, heavy duty
8 Motor car engines
2 Outfit cars equipped with woodworking machinery
1 Paint spraying outfit
2 Paving breakers
3 Pumps, portable
100 Rail and flange lubricators
2 Saws
1 Shaper
4 Tie tamping outfits
3 Tractors
2 Wrenches, power

Seaboard Air Line

1 Air compressor
1 Crane, rail
1 Drill, rail
5 Generators, portable
14 Grinders, rail, portable
21 Motor cars, inspection
20 Motor cars, section
1 Motor car, heavy duty
21 Motor trucks
1 Power rail layer
6 Pumps, portable
28 Rail and flange lubricators
1 Saw, rail
43 Tie tamping outfits
1 Weed burner

Sioux City Terminal

1 Tie puller

Southern

A-Southern

4 Adzing machines
1 Air compressor
4 Automobiles
12 Bolt tighteners
10 Concrete mixers
10 Drills, rail
1 Generator, portable
7 Grinders, rail, portable
70 Motor cars, inspection
127 Motor cars, section
75 Motor cars, heavy duty
19 Motor trucks
1 Paint spraying outfit
4 Pumps, portable
483 Push cars
11 Rail and flange lubricators
18 Saws, rail
4 Spike drivers
2 Spike pullers
1 Tie tamper, unit type
17 Tie tamping outfits
7 Tractors
7 Wagon scrapers

B-Carolina & Northwestern

1 Motor car, inspection
3 Motor cars, section
1 Motor car, heavy duty
4 Rail and flange lubricators

Southern Pacific System

A-Pacific System

2 Adzing machines
1 Air compressor
9 Air compressors, s.h.
2 Angledozers, s.h.
4 Bolt tighteners
1 Bucket, clamshell, s.h.
1 Bucket, dragline
1 Bucket, dragline, s.h.
3 Bulldozers
6 Bulldozers, s.h.
3 Carryalls
2 Concrete mixers
8 Concrete mixers, s.h.
4 Concrete vibrators, s.h.
1 Dragline, s.h.
13 Drills, rail, portable
1 Drill, wagon
2 Electric light plants, s.h.
5 Grinders, rail, portable, s.h.
2 Hammers, steam, s.h.
14 Motor trucks, s.h.
1 Pump, portable
4 Pumps, portable, s.h.
1 Road roller, s.h.
1 Rooter, s.h.
1 Scraper, s.h.
1 Table saw, s.h.
12 Tie tamping outfits
40 Tie tamping tools
1 Shovel, power
1 Tractor
4 Tractors, s.h.
3 Welding outfits

B-Lines in Texas & Louisiana

2 Adzing machines
2 Air compressors
2 Bolt tighteners
1 Crane, rail
6 Cranes, truck mounted
1 Dragline
2 Drills, pneumatic
2 Drills, rail
1 Generator, portable
4 Grinders, rail, portable
2 Grinders, tool
2 Hammers, riveting
1 Hammer, steam
1 Jackhamer
1 Mowing machine, tractor type
1 Paving breaker
2 Pumps, portable
15 Rail and flange lubricators
2 Rivet cutters
1 Saw, chain
1 Saw, rail
2 Spike drivers
2 Spike pullers
15 Tie tamping outfits
1 Tractor
3 Welding outfits
2 Wrenches, impact

C-Northwestern Pacific

1 Adzing machine
1 Bulldozer
1 Carryall
1 Grinder, rail, rail mounted
6 Motor cars, inspection
6 Motor cars, section
2 Motor cars, heavy duty
1 Tractor

D-San Diego & Arizona Eastern

2 Motor cars, inspection
4 Motor cars, section
1 Motor car engine
2 Motor car frames

Spokane International

12 Motor cars, section
1 Mowing machine
1 Weed burner

Spokane, Portland & Seattle

1 Adzing machine
3 Automobiles
3 Bolt tighteners
3 Buckets, clamshell
1 Bucket, orange peel
4 Cars, air dump
2 Cranes, rail
3 Cranes, locomotive for pile driver attachment
1 Crane, roustabout
1 Ditching machine
1 Ditching machine, s.h.
1 Hammer, steam
2 Jacks, power
18 Motor cars, inspection
26 Motor cars, section
1 Motor car, heavy duty
2 Motor trucks
1 Paint spraying outfit
12 Push cars
10 Rail and flange lubricators
6 Saws, circular
1 Spike puller
4 Tie tamping outfits

Sumpter Valley
1 Motor car, inspection

Tennessee Central
2 Motor cars, inspection
2 Motor cars, heavy duty
2 Motor car engines
1 Power rail layer
3 Rail and flange lubricators
1 Wood borer
1 Wrench, impact

Tennessee
2 Pumps, portable
10 Rail and flange lubricators

Trona
1 Discer

Union Pacific
1 Air compressor
2 Electric lighting plants, s.h.
1 Generator, portable
2 Grinders, rail, portable
38 Motor cars, inspection
126 Motor cars, section
23 Motor cars, heavy duty
3 Pumps, portable
1 Saw, rail
40 Trailers, motor car

A Large Mileage of Ballast Was Cleaned During the Year

Texas & Pacific
4 Automobiles
1 Bolt tightener
1 Crane, rail
15 Motor cars, inspection
28 Motor cars, section
8 Motor cars, heavy duty
2 Mowing machines
6 Pumps, portable
7 Saws, circular
11 Saws, rail
70 Tie tampers, unit type
10 Tie tamping outfits

Texas City Terminal
1 Weed burner

Terminal Railroad Association
1 Air compressor
1 Air compressor, s.h.
1 Cutting torch
1 Drill, pneumatic
1 Engine for floor sweeper
2 Grinders, rail, portable
2 Guns, grease
2 Hammers, chipping
3 Hoists, chain
12 Jacks, power bridge
6 Rail and flange lubricators
5 Rivet busters
4 Tie tamping outfits
2 Tractors
1 Welding outfit
2 Wrenches, impact

Texas, Pacific-Missouri Pacific Terminal
1 Bolt tightener
1 Drill, rail
1 Grinder, rail, portable
2 Motor cars, section
1 Mowing machine
1 Saw, circular
1 Saw, table type
1 Weed burner

Toledo, Peoria & Western
1 Automobile
1 Discer
1 Motor car, inspection

Toledo Terminal
1 Rail and flange lubricator
1 Welding outfit
3 Wood borers
3 Wrenches, impact

Union
1 Towing winch
1 Track shifter, s.h.
1 Trailbuilder
1 Tractor

Union Terminal
1 Trailer, motor car

Ventura County
1 Motor car, section

Virginian
1 Drill, bonding
2 Motor cars, section
12 Rail and flange lubricators

Wabash
2 Adzing machines
1 Dragline, s.h.
2 Grinders, rail, rail mounted
1 Jack, power
6 Motor cars, inspection
18 Motor cars, section
12 Motor car engines
1 Motor truck
2 Mowing machines, tractor type
3 Rail and flange lubricators
1 Saw, rail
1 Spike puller
12 Tie tampers, unit type
2 Tie tamping outfits
12 Trailers, motor car
1 Welding outfit
1 Wood borer

Western Maryland
1 Air compressor
2 Bolt tighteners
5 Ballast cleaners
2 Cars, dump
1 Concrete mixer
4 Drills, rail
2 Grinders, rail, portable
4 Motor cars, inspection
9 Motor cars, section
3 Motor cars, heavy duty
2 Motor trucks
2 Power mowers
2 Push cars
10 Rail and flange lubricators
1 Saw, circular
4 Saws, rail
4 Tie tampers, unit type

Western Pacific
9 Air compressors
1 Automobile
2 Concrete mixers
2 Concrete vibrators
1 Crane, locomotive
1 Crane, rail
6 Motor cars, section
1 Motor truck
2 Pipe benders
12 Rail and flange lubricators
1 Trenching machine
1 Weed burner

Wheeling & Lake Erie
7 Automobiles
2 Motor cars, inspection
2 Motor cars, section
4 Motor cars, heavy duty
2 Motor trucks

Willamina & Grand Ronde
1 Motor car, inspection

CANADA

Canadian Pacific
1 Ballast maintenance machine
2 Bolt tighteners
50 Cars, hand
3 Concrete mixers
1 Crane
2 Cranes, locomotive
5 Discers
1 Dragline
3 Drills, rail
1 Engine for rail drill
1 Generator, portable
4 Grinders, rail mounted
3 Grinders, rail, portable
16 Motor cars, inspection
6 Motor cars, section
20 Motor cars, heavy duty
101 Motor car frames
1 Mowing machine
1 Mule, shop
3 Paint spraying outfits
152 Push cars
2 Pumps, portable
1 Rail and flange lubricator
1 Rail laying machine
4 Saws, rail
1 Snow loader
1 Snow plow, tractor mounted
1 Tie tamping outfit
2 Tractors
3 Welding outfits

Dominion Atlantic
1 Automobile
1 Motor car, inspection

Newfoundland
2 Cranes, locomotive
6 Generators, portable
6 Motor car engines
1 Saw, rail
1 Weed burner

Sydney & Louisburg
3 Jacks, power bridge
1 Motor car, section
1 Motor car engine
4 Motor car frames
2 Scalers
1 Wrench, impact

Temiskaming & Northern Ontario
1 Bolt tightener
2 Motor cars, inspection
7 Rail and flange lubricators
4 Tie tampers, unit type

Toronto, Hamilton & Buffalo
3 Drills, bonding
1 Motor car, inspection
1 Motor car, section
3 Motor car engines

Winter—

A Challenge

With the Present Unprecedented Volume of Passenger Travel, A Tie-Up of Important Passenger Terminals Would Be Disastrous

THE importance of adequate preparations for the storms that track men have learned to expect at this season of the year was stressed by four officers in charge of important terminal facilities in the Chicago area at a meeting of the Maintenance of Way Club of Chicago on December 20. Because of their timeliness to other track maintenance officers on northern roads, the papers presented by these men are abstracted below.

Advance Measures Essential

By S. H. Shepley
Supervisor of Track, Elgin, Joliet & Eastern, Joliet, Ill.

WHAT are our winter problems? Why do they exist and why is it necessary to plan in advance to combat them?

The basic purpose of our railroads is to provide economical, fast transportation service for the mass movement of materials and persons. Winter, with its low temperatures and storms, could defeat this purpose without proper foresight by railroad maintenance forces. At this time when we are at war, winter will put our depleted maintenance forces on the spot.

Every discussion of preparations for winter turns quickly to the problem of labor. We are now completing a stationary camp at Joliet by remodeling a roundhouse to provide living facilities for approximately 70 men. If we can keep 50 men in this camp, our labor problem in this terminal will be greatly eased.

We have tried to get men from our traveling extra gang to move into bunk houses on various sections where our labor supply is acute but, on the whole, this has not been very successful, since it seems to be necessary to furnish meals and bedding to this class of labor, for very few of these men will do their own housekeeping.

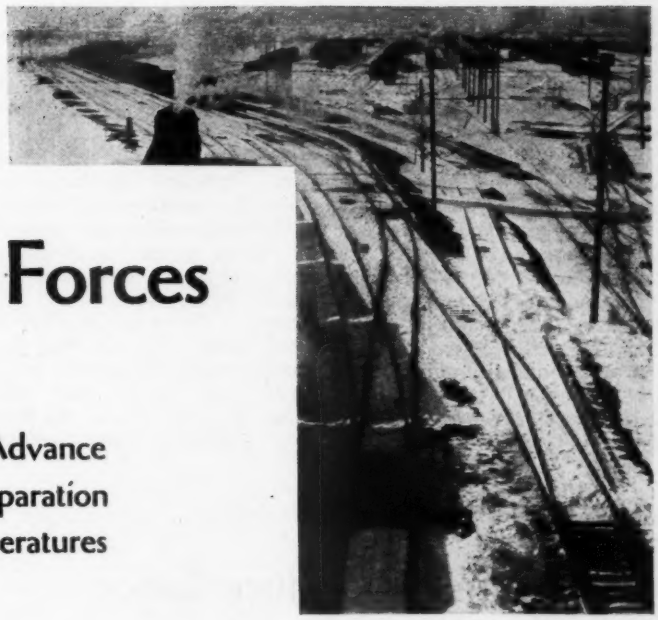
Our chief engineer has contacted the senior officer of a negro army camp located south of Joliet to obtain the services of these men in time of storms, most of whom would be needed at outlying stations. Under the arrangement perfected, the army will furnish truck transportation and the railroad will furnish tools and meals. We have arranged with several restaurants along the line to feed these men, if given a little notice.

Aside from manpower, preparation for winter consists of getting ready existing facilities. So far as the track department is concerned, these tasks can be divided into three main groups:

(1) The preparation of the track structure. In this category, we raise our worst joints, clean out the dirty ballast in our railroad crossings and their accompanying drainage systems, and surface and line the crossings. These precautions will not carry us through the winter but, with the use of shims, we expect to keep them in good surface.

A number of street crossings have been cleaned of old ballast, planks renewed, and the track surfaced, gaged and lined. One street crossing that carries exceptionally heavy street and rail traffic and that had been a constant source of maintenance trouble for us during the preceding winters, has been entirely renewed with a prefabricated sectional black gum crossing, including the space between tracks. This will put an end to the heaving of the center concrete strip and eliminate complaints from the traveling public. We have on order plywood and creosoted shims for use in shimming low joints.

(2) The preparation of the right-of-way and appurtenances. Under this category, we have installed most of our snow fences, burned some of the right-of-way weeds, checked all flanger signs and cleaned culvert pipes and ditches. We have purposely neglected some of these tasks until now in order to get the track struc-



Every Effort Must Be Made to Keep War-Time Freight Moving and Important Yards Must Be Kept Functioning

to Maintenance Forces

Track Officers Describe Advance Precautions Taken in Preparation for Snow, Ice and Low Temperatures

ture in as good condition as possible before freezing weather.

(3) Under the third category I include the preparation of supplies, tools and equipment for winter use. We have checked snow plows as to their operation, clearance of plow and flangers; and have gone over our supply of miscellaneous tools and supplies. Snow brooms and salt have been shipped to the various sections.

We have equipped some of our double slip switches with fuel oil heaters of a blow torch type but, to date, they have not proved very satisfactory. We have some commercial gas switch heaters that give more satisfactory results. In heavy snow storms we have found that locomotives with perforated steam pipes on the front end are of great assistance in keeping main yard switches open.

As the depleted track forces on many sections are not able to handle the heavy motor cars, we have secured small two-men motor cars on which the men can patrol their sections during the winter months.

Preparation a Year-Round Task

By P. V. Thelander

Division Engineer, Chicago & North Western, Chicago

PREPARATION for combating and preventing winter conditions which affect the track structure adversely and interfere with or disrupt train operation, should be kept in mind at all times. This applies to the placing of turnouts or other facilities in cuts or at any other locations where prevailing winds will cause snow to drift, and where poor drainage or soil conditions cause heaving, etc. However well planned, there are still many locations where drifting snow, heaving track and bad ice conditions cannot be avoided and preparations should be made to combat these conditions as they become evident.

In the outlying territory and in the Chicago Terminal area, preparations include equipping each section with the necessary tools, supplies, and equipment. These include snow shovels, fibre brooms, kerosene for switch heaters where used, snow-burning oil, shims for heaved track, and salt and sand for station platforms and walks. Cinders or sand are placed at important public grade crossings, and snow fences repaired. More than 16,000 ft. of portable snow fence has been placed on our Galena division this fall.

Our roadmasters have been instructed to contact state, county and township highway officers and municipal authorities to request their cooperation in keeping grade crossings cleared of snow, flangeways clean, and cinders or sand spread on crossings and approaches in order that they may be kept open and safe for both highway and railroad traffic.

Preparations for combating adverse winter conditions in the Chicago Terminal area present many problems that are not encountered in outlying territories. Delays to trains in a terminal disrupt schedules on the entire system and an important factor in preventing such terminal delays is the efficient operation of oil and gas burning snow melters at the various interlocking plants. Our gas burning snow melters, which are dismantled and stored during the summer, are replaced in track ready for service by November 1. Oil burning switch heaters are cleaned, and oil founts are filled and made ready for use when required. We have two interlocking plants in the Chicago Terminal district equipped with gas burning switch heaters having a total of 3,324 burner units. At Proviso Yard hump, we have 18 propane gas heater units, and at other interlocking plants and switches, we have 1,616 oil burning heater units ready for service—300 of these latter units were acquired this fall.

Switch heaters or snow melters make it necessary to provide drainage or run-off for the water. At one large interlocking plant with 27 turnouts and 23 double slip switches, located on the elevated approach to our Chicago passenger terminal, the rock ballast is foul and water cannot readily run off into the deck drains. To overcome this condition, scrap boiler flues have been placed to carry the

water from the pockets at double slip switches and other units equipped with switch heaters, to the deck drains, and these drains have been cleaned to permit rapid run-off. The ballast has been removed to the proper depth between ties and outlets provided for the water at important turnouts and at interlocking plants where oil-burning switch heaters are to be used.

In the event of severe snow storms, personnel requirements will not be satisfied easily during the present man-power shortage, and, to avoid a tie-up in the terminal area, it may be necessary to use high school students and others recruited by radio appeal, supplemented possibly by personnel from the armed services stationed in this district.

Snow removal is one of the most hazardous duties of track maintenance forces. This is due primarily to the severe weather conditions that prevail, and also to working after dark and long hours. The importance of working safely and the added responsibilities of supervisory officers are stressed in all instructions issued in regard to snow handling and other winter work.

The most important and most valuable assets we have as we face our winter emergencies are our loyal section forces and supervisors—the fighting men in the front line of the battle of winter operation.

Snow Melters Reduce Labor

By T. H. Strate

Division Engineer,
Chicago, Milwaukee, St. Paul & Pacific,
Chicago

WE have approximately 82 miles of main tracks and 260 miles of side tracks, or a total of 342 miles of maintained trackage for which we have to provide the necessary labor and equipment to combat snow and ice and other conditions that develop during the winter. Snow handling is under the general direction of the division superintendent, with the division engineer and roadmaster in field charge. Our Terminal division is divided into six zones, corresponding to the territories maintained by the various section gangs. After conferences with operating department heads, instructions are issued by the superintendent giving the general line up for handling snow.

Key men are assigned to all important locations and it is their duty to be available on call whenever storms are imminent. When it becomes apparent that the regular section forces can not take care of the snow, it is the practice to order floating labor from the labor offices. These forces are distributed by the roadmaster as they are sent out.

We have approximately 508 main track switches and 1240 side track switches in the terminal. At the crossing with the C. & N. W. at Western Avenue we have approximately 1700 gas burners using city gas. Towers A-3 and A-4 at Western Avenue, including the coach yard leads, are equipped with approximately 2000 burners using propane gas. We also have approximately 100 propane gas burners at the connection with the C. & N. W. freight line north of Bensenville, and are installing gas burners to use city gas at Pacific Junction.

In addition to gas burners, we have approximately 1200 oil burners. The use of these burners has reduced labor requirements at 500 to 600 men.

Our first order of business in the spring is to take up the switch heaters and remove the oil burners, at which time they are examined by the roadmaster and signal supervisor and repair parts ordered for the next season. The material is specified for delivery to permit the burners to be reinstalled before November 1. Also, portable snow fence is erected before November 1 in those places where we are troubled with drifting snow. We have 22,000 lineal feet of such fence in the terminal.

Switches are dug out before the ground freezes and cinders and salt are piled at the various street crossings, for use when the crossings become slippery. Cinders and salt are also stored on cars for unloading along switching leads when they become slippery. Each section headquarters is provided with snow brooms, picks and shovels and the division storekeeper is charged with responsibility for having sufficient additional supplies on hand to meet any possible demand in storms.

In addition to the work assigned to the track forces, our chief carpenter is in charge of and responsible for the cleaning of all station platforms, team tracks, driveways to and from our Galewood freight transfer platform and all street crossings. He arranges directly with the division engineer for the use of such equipment as dump trucks, tractors, etc., and for the necessary men. He is responsible for 50,000 sq. ft. of platforms, 521,000 sq. ft. of driveways and 452 grade crossings.

In ordinary snow storms it is the duty of the various agents, yardmasters, car foremen, roundhouse foremen, etc., to put their regular forces to work in the most effective manner to keep the platforms, driveways and tracks under their control clear for operation. The coach yard forces have 18 snow melters or large tubs with hose connections to steam lines, which are used for disposing of snow and ice and set to drain to adjacent sewers.

The mechanical department furnishes locomotives equipped with steam flangers, and is responsible for seeing that they are kept in proper working condition. Eighteen locomotives are so equipped and their field of operation is principally on the

Advance Preparation of Switches and Switch Heaters Is An Important Part of Winter Work

switching leads, on which they work back and forth through the storms.

We have five cranes equipped with buckets and snow wings for loading snow in trucks or cars. We have one flanger but do not have standard snow plows or Jordan spreaders definitely assigned to the terminal. If these become necessary they are brought in from the outside.

We have 7 company trucks of ½-ton to 2-ton capacity, for handling men and tools. When it becomes necessary to haul snow from team tracks, dump trucks, tractors with snow pushers and loaders are rented from outside contractors.

Floating labor and such local labor as may be recruited in times of emergency are paid at a cashier's office in a freight station where the agent's forces are organized to handle the payment of snow tickets given the men by timekeepers in the field.

Tools, equipment and supplies furnished sections and stored at key locations include kerosene switch heaters and kerosene torches, benzol and benzol cans, snow brooms, switch point scrapers (made from short pieces of pipe and transferred from one broom handle to another as the brooms wear out), scoops, salt, burlap and twine.

Most of the switches at the hump end of our Clearing Yard classification tracks are equipped with electric snow melters; kerosene switch heaters are installed in the other switches at this location and at two interlocking plants. The regular section forces keep these facilities functioning in most storms and extra help is furnished during severe storms.

In the distribution of cinders and salt at highway crossings, it has been found that time and labor are saved by using a truck and a few men to service the crossings, even when the supplies are on the ground. The truck is loaded with salt at the store house and travels from crossing to crossing. Men accompanying the track scatter the salt or cinders as conditions warrant, covering the 18 crossings in the vicinity of Clearing in a few hours. If necessary, this work is done during the night so that the crossings are salted or cindered before the morning rush of traffic on the highways. In emergencies, one bridge and building truck (a recently acquired station wagon), and store department trucks are used to transfer men, replenish supplies and distribute lunches during storms.

Most of our switch ties were installed during September and October. While doing this work the foremen also start to get their switches and leads ready for winter. This includes cleaning out the tie cribs under switch points, and providing drainage along switching leads. Crossings are usually surfaced with clean ballast in the fall to provide good drainage. Kerosene heaters are installed during October, at which time necessary tie protection is provided.

Bridge and building forces check water service facilities and protective measures are taken to prevent the freezing of water lines. When zero or sub-zero weather extends through several days, they install and service salamanders at water columns and other locations found to be vulnerable during extreme low temperatures.

Each storm creates problems that must be handled as they arise and instruction or preparations, no matter how complete they seem to be, do not meet all conditions. This year, with forces depleted and no assurance that extra labor will be available, our problems will be many in severe storms.

Organization the Secret

By H. C. Koch

Roadmaster, Belt Railway of Chicago
Clearing, Ill.

I AM associated with a terminal road that switches freight received from, and consigned to all of the railroads in the Chicago District and that also serves hundreds of industries. The heart of our operation—Clearing Yard—has a two-way hump, with receiving, classification, departure and other auxiliary yards and tracks. Along the main line are 10 important interlocking plants and junction points. Flat switching operations are necessary in 9 outlying yards, usually on more than one lead.

A meeting called by our superintendent on November 10 was attended by representatives of the operating, locomotive, car, store and maintenance departments. Among the subjects discussed were:

At L.C.L. freight stations, freight house employees shall clean platforms and switches serving these facilities. If it should become necessary to clean driveways after a heavy snow storm, freight agents have authority to call contractors who have bull dozers. Arrangements have been made with contractors for this service.

Reviewed with operating department representatives the most important yard tracks to be kept open. Operating, locomotive, car and store department help to be available at certain locations.

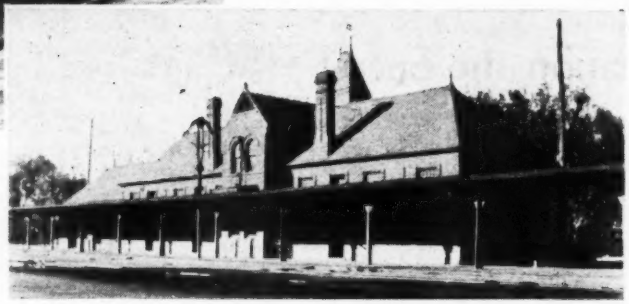
Reviewed progress of winter preparations, such as the distribution of supplies, trucking cinders and salt to highway crossings; hiring, transporting, paying extra help, etc.

The roadmaster represented the maintenance of way department at this meeting and received assurances from those present that he will have their full co-operation in the event of severe storms. After this meeting, instructions were issued to foremen and other employees in the maintenance department. One circular covers the general subject, including the following items:—reporting promptly at the beginning of a storm; furnishing telephone numbers to all concerned; hiring extra help; precautions to be taken in extreme cold weather to prevent the freezing of hands and feet; co-operation with yardmasters, including the use of locomotives with snow blowers; the use of salt and cinders on approaches to tracks at highway crossings; and the feeding of men at restaurants, or with supplies purchased at nearby stores.

Another circular outlined the distribution of forces for an indefinite length of time. Relief supervision and some extra help for interlocking plants and other important locations are provided from bridge and building forces and road department welders, motor car operators, crane operators and their helpers. These men have instructions to report at assigned locations when called by the section foremen or the roadmaster. Some foremen must arrange their own relief by assigning a man in their gang to take over while they get some rest.

Our operating department has reissued a bulletin cautioning trainmen to be careful to see that all switch points are properly cleaned out and points closed before locomotives and cars are moved over them. Another bulletin tells all engine and train men to keep a sharp look-out during snow storms and run slowly, if necessary, when approaching and passing through interlocking plants and switches, expecting to find men working on tracks. They are also told to avoid opening cylinder cocks while passing these locations and to ring the bell and use the whistle if necessary. Train crews can help by following these instructions.

Small-Station



The Main Problem Confronted in Modernizing the Exterior of the Station at Oshkosh, Wis., Lay in the Elimination of Much of the "Gingerbread" of the Roof Construction

JUST before the war put a stop to many proposed passenger station renovation and modernization projects, and restricted the scope of many other such projects, the Chicago & North Western completed the modernization of four of its smaller, between-terminal stations, completely transforming their appearance, particularly on the interior, and in each case at moderate cost. These projects are so illustrative of what can be done in this regard with modern materials, and typical of what is being planned on the North Western and on other roads just as soon as conditions permit, that they are described in this article.

The four stations in question include those at Oshkosh, Neenah-Menasha and Appleton, Wis., all within a distance of about 20 miles on the route of the road's streamlined "400" trains to points in Northern Wisconsin and Northern Michigan, and at South Beaver Dam., Wis., about 60 miles northwest of Milwaukee, Wis., on the route of the road's streamlined "400" trains operating between the Twin Cities and Chicago. In fact, the station improvements at each of these points, carried out in 1941 and the early part of 1942, were in large measure a counterpart to the improved passenger train service inaugurated in these territories, as exemplified both by the new Diesel-powered streamlined trains put in service and by improvements made in passenger train schedules generally. In each case, at a figure representing only a small fraction of the cost of a new station, existing outmoded buildings, in some details requiring considerable repairs, were brought into step with present-day requirements and modern architectural trends.

One-Story Structures

All of the stations are one-story structures. Three, built between 1889 and 1902, are of stone and brick construction in a modified Classical style of architecture. The fourth, at South Beaver Dam, built in 1911, was of frame construction throughout, without any particular architectural style. The modernization work carried out at each of these points, particularly as regards the exterior and the arrangement of the interior, varied with the specific requirements at each point, but the interior finish and decoration at all of the stations was fundamentally the same as to the materials used, varying largely only in the color schemes employed.

In the stone and brick stations at Oshkosh, Neenah-Menasha and Appleton, the exterior work varied from fundamental changes in the architectural lines of the buildings, combined with cleaning and redecorating, to cleaning and redecorating alone, with only necessary routine repairs. In the frame, wood-faced structure at South Beaver Dam, routine repairs on the exterior, combined with cleaning and repainting, sufficed to give it a satisfactory appearance. Since the station at Oshkosh is the largest of the four stations involved, and because the work at that point is representative of that carried out at the other points, major attention will be given to the modernization of that station, with reference to the other stations only to point out distinctive features.

Oshkosh Station

The station at Oshkosh is, in general, a rectangular structure 22 ft. wide by 147 ft. long, which includes a baggage room at its south end, about 40 ft. in length. This leaves a rectangular area approximately 107 ft. long for passenger facilities, the right lines of which are broken only by two small projecting bays about midway of its length.

Fundamentally, the structure, built in 1902, is of modified Classical architecture, with exterior walls of light salmon-color brick above a 5-ft. high grey limestone base, a multi-gabled slate roof, and a connecting train-side frame canopy of the simple shed type. Sound throughout, the main problem which was confronted in modernizing the exterior of the building lay in the elimination of much of the "gingerbread" of the roof construction, complete cleaning of the brick and stonework, and the repair and painting of the platform canopy—the repair work involving essentially the replacement of worn out galvanized drain gutters with OG wood gutters.

In modernizing the appearance of the roof, the most important changes made were the removal of a high, prominent tower on the town side, together with several unnecessary brick chimneys, the truncating of two prom-

Modernization Projects

Point to Large Possibilities Ahead

Four jobs on the North Western, remodeled prior to present restrictions, completely transformed old structures at moderate cost

inent gables, centered on each side, and the elimination of certain ornamental features, highly appropriate to the structure as built, but entirely out of keeping with the more rectilinear lines of present architectural style. Robbed of these features, the remodeled station now has a low squatty appearance instead of its former top-heavy aspect.

Fundamental too, in the improvement of the exterior, were the provision of new window sash throughout, with multiple horizontal panes divided by wood muntins, or the installation of glass blocks in some cases, replacing large panes of plain glass; and the cleaning of the brick and stonework and repainting of the platform canopy. The latter two items of work were particularly essential and effective because the pleasing natural color of the face brick had long since been buried under five or more coats of paint, the last of which had been applied several years previous, and the dark grey finish of the platform canopy had lost any pleasing appearance it might have had originally.

In cleaning the face brick, the paint was removed with the aid of a multi-flame low-pressure gas burner, covered by a hood, which so buckled and loosened the paint that it could be scraped off readily with hand scrapers. Following this rough cleaning, the brick face was given a light sand blast, which was extended down over the limestone base, restoring both the soft salmon color of the brick and the uniform grey tone of the native limestone. To help preserve these restored surfaces, both the brick and the stone were then given a brush coat of clear waterproofing compound. With this and the roof work out of the way, the platform canopy was cleaned as necessary and repainted, the weathered dark grey and red of the former color scheme giving way to a light green roof structure with black posts.

Interior Transformed

Within the station, the transformation effected was so complete, both as to arrangement and decoration, that the aspect is that of an entirely new structure. Prior to the changes made, the old waiting room, the full width of the building and approximately 105 ft. long, was divided near the center by a fully-enclosed ticket office on the track side and a women's toilet on the town side, with only a 6-ft. passage between them. Thus, in reality there were two separate waiting rooms, one approximately 20 ft. wide by 48 ft. long, assigned to men, the other 20 ft. wide by 38 ft. long, assigned to women. The floor throughout was of

Right, Above—View in the Old Cut Up Interior of the Oshkosh Station. Right—The Modernized Interior Opened Out Into One Large Room, With Open-Top, Glass Front Ticket Counter

wood, in need of repair, and the walls and ceilings, above a 4-ft. wainscot of matched and beaded wood, painted dark brown, were of plaster, with a grey paint finish which had become badly soiled. Old-style paneled doors; dark oak trim; bowl-type, ceiling-hung lighting fixtures; exposed wall radiators and multiple-arm cane settees of an early vintage, added further to the outmoded appearance of the interior.

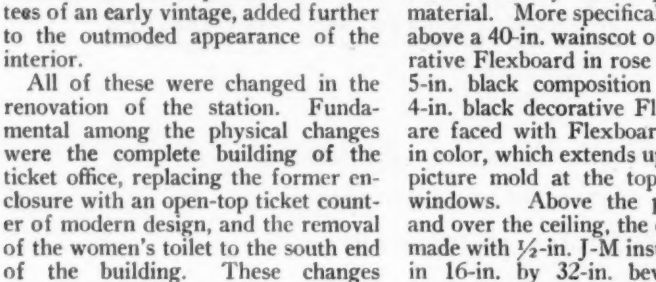
All of these were changed in the renovation of the station. Fundamental among the physical changes were the complete building of the ticket office, replacing the former enclosure with an open-top ticket counter of modern design, and the removal of the women's toilet to the south end of the building. These changes opened the interior into one continuous room, 95 ft. long. At the south end of this room, new toilet facilities for women were provided alongside new toilet facilities for men, in an arrangement which will be mentioned later.

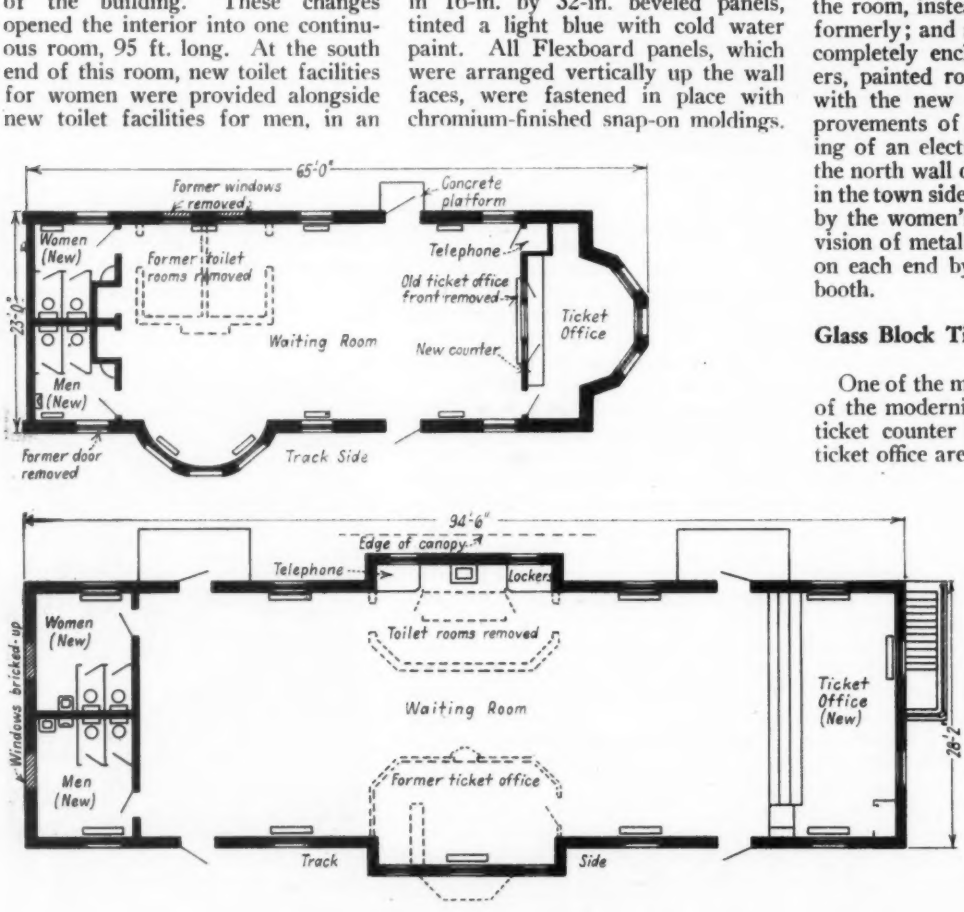
Completely altering the decorative aspects of the interior, the old wood floor was covered with Johns-Manville asphalt tile in a herringbone pattern of marbleized blue and grey, and all wall and ceiling areas were refaced with colorfully tinted prefabricated material. More specifically, the walls, above a 40-in. wainscot of J.-M. decorative Flexboard in rose color, with a 5-in. black composition base and a 4-in. black decorative Flexboard cap, are faced with Flexboard, light grey in color, which extends up to a 2½-in. picture mold at the top line of the windows. Above the picture mold and over the ceiling, the covering was made with ½-in. J-M insulating board in 16-in. by 32-in. beveled panels, tinted a light blue with cold water paint. All Flexboard panels, which were arranged vertically up the wall faces, were fastened in place with chromium-finished snap-on moldings.

Completing the improved appearance of the interior brought about by the new wall and ceiling coverings, the ceiling directly over the ticket office area was dropped between enclosed beams to break up the otherwise uninterrupted expanse of ceiling; doors and windows were replaced, the latter as already mentioned, by sectional sash with horizontal muntins, or, in the case of small transom windows along the side walls above the picture mold, with glass blocks; the old bowl-type lighting fixtures gave way to a series of eight chandelier-type fluorescent lighting fixtures, each with four 36-in. tubes; the old settees were replaced with refinished solid oak settees, of natural color, arranged crosswise of the room, instead of longitudinally as formerly; and all wall radiators were completely enclosed with metal covers, painted rose color to harmonize with the new wainscot. Other improvements of note were the centering of an electric, open-face clock in the north wall of the room, and, within the town side bay occupied formerly by the women's toilet room, the provision of metal parcel lockers, flanked on each end by a recessed telephone booth.

Glass Block Ticket Counter

One of the most distinctive features of the modernized station is the new ticket counter provided, enclosing a ticket office area approximately 17 ft.





Left Above—Floor Plan of Appleton Station as Rearranged. Left—Floor Plan of the Remodeled Station at Neenah-Menasha. Below—The Rearranged Facilities at the Oshkosh Station

by 12 ft. in the same location as the former ticket office. The new counter, which is oval in shape, is constructed essentially of 8-in. by 8-in. glass blocks, four tiers high, between decorative base and cap strips of black composition material, and surmounted by a black Formica counter top, trimmed with aluminum. Adding to the modernistic appearance of the counter, particularly at night, is the provision of back-side illumination of the glass front with two continuous Neon tubes near the top, one giving off a yellow light and the other a blue light. Reflected downward against the back face of the glass blocks by a continuous metal reflector, these light colors blend to give an unusually pleasing illuminating effect to the front face of the counter.

In connection with the relocation of the women's toilet room at the south end of the waiting room, a new men's toilet was also provided, replacing a former inadequate men's toilet in a recess in the baggage room which joins the south end of the waiting room. In the new arrangement, the women's and men's toilets are back to back in an area 10 ft. wide, continuous across the room. Both of these facilities are provided with terrazzo tile floors, plastered walls and ceilings painted light grey, modern plumbing and sanitary fixtures, and enamel-faced metal toilet enclosures. As in the main waiting room, the lighting fixtures are of the fluorescent type and the heating radiators are fully enclosed.

Neenah-Menasha Station

In the one-story brick station at Neenah-Menasha, which is somewhat smaller than the station at Oshkosh, practically all of the modernization work was confined to the interior, the low architectural lines of this station, built in 1891, being more in keeping with present style than the lines of the Oshkosh station. However, as at Oshkosh, both the stone base and the brick face were sand blasted to restore their original appearance, were repointed where necessary, and were coated with a clear waterproofing compound. In addition, old-style doors and windows were modernized, and all exterior wood trim, including the heavy beam-type brackets which support a broad overhanging roof on all sides, were repainted a light green.

Within the interior of this station, which has an overall area approximately 92 ft. long by 26 ft. wide, practically the same conditions as to arrangement and decoration prevailed as at Oshkosh, and with few exceptions the remedy applied was the same. Here, opposite enclosures about midway the length of the floor area, one housing a ticket office and the other toilet rooms for men and women, cut the interior into separate small waiting rooms, connected by a passageway only 9 ft. 6 in. wide. Combined with this was the drab appearance of the grey painted plaster walls and ceiling above a high, dark-finished, matched and beaded wainscot. All of this was changed.

To give expanse to the main public area, both the old ticket office and the toilet rooms were removed, the ticket office being relocated at the extreme north end of the room, and the toilets at the extreme south end, opening up the entire interior into one large room. With this done, the floors, walls and ceilings throughout were redecorated with the same types of materials as used in the Oshkosh station. Here, however, the asphalt tile floor is in a pattern of marbleized grey, blue and tan, the Flexboard wainscot and wall areas above are finished in green and buff, respectively, and the insulating board covering of the ceiling is tinted a rose color. New modern sash and doors, the former with multiple panes in the upper halves; seven new four-tube fluorescent lighting fixtures; a new electric clock; enclosed radiators and completely refinished oak back-to-back settees, combine with the new floor, wall and ceiling decoration to give the interior a modern tone and pleasing appearance.

The new ticket office, which occupies a width of 10 ft. across the north end of the enlarged waiting room, is separated from the public by a straight open-top counter, this counter having a solid, oak-finished birch front above a black composition base and a wide black Formica top. The rear of the counter, as at Oshkosh, is divided into drawers, cupboards and storage space for the convenience of the ticket agent.

In their new location across the south end of the waiting room, the new toilets for men and women, arranged back to back, occupy a depth of only 10 ft., making each room 12 ft. 8 in. long by 10 ft. wide. Here, the finish, decoration and plumbing are exactly the same as in the station at Oshkosh, with the same satisfactory results as at that point.

Appleton Station

At Appleton, the third of the stone-base brick structures renovated, the measures taken, both interior and exterior, were almost identical with those employed in Neenah-Menasha station, even to the color schemes employed on the interior. In this station, which was built in 1889, and which is the smallest of the three, with an interior 61 ft. long by about 20 ft. wide, the conditions were at least as bad as prevailed at Neenah-Menasha. Here, where the toilet rooms and a fully enclosed ticket office were originally in a central location, an earlier attempt at renovation had moved the ticket office to the south end where it was again fully enclosed.

The Interior of the Remodeled Neenah-Menasha Passenger Station Shows the Effective Use Made of Modern Ceiling, Wall and Floor Coverings

The Ticket Window End of the Remodeled Station at Appleton, Wis.

The toilet rooms remained in the original position, but the situation was thrown entirely out of balance as, at the time of this earlier renovation project, approximately 21 ft. of the waiting room area north of the projecting toilet rooms was walled off and incorporated into adjacent express agency quarters, leaving a waiting room area at this end only about 11 ft. wide. To remedy this chopped-up effect, the recent renovation project involved the complete removal of the existing toilet rooms and their relocation across the extreme north end of the waiting room area. This opened up the entire interior into one room approximately 42 ft. long for the full width of the building.

Different Ticket Office Front

The ticket office at the south end of the room was not disturbed, but was given a new front, differing entirely from the construction employed at either of the other stations described. Here, a solid partition, except for a broad ticket counter, separates the ticket office from the waiting room, the partition, in large part, like the side walls, being faced with buff-colored decorative Flexboard above a green-colored wainscot of the same material. The ticket window is only 4 ft. wide, but is framed on both sides by built-in, glass-covered cabinets for train bulletins and display advertising, which combine with the window and a continuous projecting counter and counter cap mold to give the effect of a 10-ft. opening. The ticket window itself is closed off by three fixed horizontal plate glass panels, one above the other, with two-inch openings between them and a clear space of four inches between the lowest panel and the counter top to permit transactions with passengers.

Above the full width of the ticket counter, to the ceiling level, the partition enclosing the ticket office is a solid panel of glass blocks, a feature incorporated, in part at least, to improve daylighting within the waiting room by admitting light from three large exterior windows in the opposite exterior face of the ticket office. The only other special work within the station at Appleton was the provision of a public telephone booth, recessed into the front of the ticket office at one side, and four tiers of metal parcel lockers at the north end of the waiting room, which are recessed into the new toilet room areas.

South Beaver Dam

At South Beaver Dam the road already had a not unshapely or unsightly passenger station of frame construction with slate roof, and which had been kept in a fair state of repair. However, to bring this station into line with the improved passenger service being afforded this community, the building required cleaning and repainting, and the conditions throughout the interior called for complete overhauling and redecorating. Fundamental at this point too, were the needs for running water and inside toilet facilities, the provision of which formed a considerable part of the recent work carried out.

The station building at South Beaver Dam, housing a freight room as well as passenger facilities, is 72 ft. long by 20 ft. wide. It has an exterior face of 6-in. drop siding and a low, double-pitched roof with overhanging eaves. In the renovation work, the exterior was refinished in kind—a grey body with green trim, but, substantially affecting the appearance of the exterior, all doors and window sash were renewed, glass paneled exterior doors replacing old solid wood paneled doors and sectional wood sash being employed in the upper halves of all windows replacing full or half panes.

Waiting Room Enlarged

Within the station, where the freight room, approximately 37 ft. long, took up more space than the waiting room and intervening ticket office combined, with a length of approximately 33 ft., the major changes made were designed to increase the waiting room area and to provide the long-needed inside sanitary facilities. To make these changes possible, the north wall of the passenger area was pushed back into the freight room a distance of 17 ft., providing approximately 11 ft. more waiting room and two areas, 9 ft. 9 in. long by 5 ft. wide, for abutting men's and women's toilet rooms.

To bring the additional waiting room area and new toilet rooms into contact with the existing waiting room, with its floor area 21 ft. by 19 ft., the old ticket office, which had extended across the full width of the building, was cut back 8 ft. on the west side, affording a connecting passage of this width. Facing on this new passage is a new ticket window. These changes, combined with the provision of a new deep well, and the construction of a new concrete septic tank and effluent disposal system, brought about the essential additional passenger facilities required.

While making these changes, it was decided to redecorate the interior of the station completely, with the result that the finished interior, except as to size, is comparable in every respect, and, in fact, similar in appearance, to the interiors of the stations at Neenah-Menasha and Appleton. Here again, effective use was made of colorful asphalt tile to hide a worn and discolored wood floor, and of variously colored decorative Flexboard and insulating panels to renew wall and ceiling faces. Here too, the public is now served over an attractive ticket counter, and is afforded sanitary facilities.

More Work Ahead

In addition to the station modernization projects described, the North Western, during the same period, made extensive improvements to its station at Rochester, Minn., as described in *Railway Engineering and Maintenance* for April, 1941, and completely modernized the interior of its large passenger station at Milwaukee, Wis., the latter work being described in the *Railway Age* for April 25, 1942. Furthermore, awaiting only approval by the War Production Board, or the termination of the war, the road plans the modernization of at least four other stations and the construction of two new stations to meet changed conditions.

The modernization of the four stations described in this article cost a total of approximately $33,000—that at Oshkosh costing $12,000, that at Neenah-Menasha $9,000, and those at Appleton and at South Beaver Dam, $6,000 each. All of the work was carried out under contract, under the direction of B. R. Kulp, chief engineer, plans for the projects being prepared in the office of L. C. Winkelhaus, architect-engineer of the road.

What's the ANSWER?

Inspecting Rail for Defects

Considering the present density and importance of traffic, to what extent should section foremen be required to inspect rail for defects on lines where detector cars are operated? For what defects? How should this be done?

Must Inspect

By C. B. Bronson
Inspecting Engineer, New York Central System, New York

Regardless of whether the rail detector car is to be operated over a given territory, the section foreman and his forces must be alert and vigilant at all times for signs or indications of broken or defective rails. This duty, under the guidance of supervisory officers, rests not only on the section foreman, but on the men in his gang as well. The effectiveness of such inspection is demonstrated by the many reports received of defective rails discovered by laborers as well as those credited to section foremen.

In view of the present load on section forces, and even in normal times, rail inspection can be handled much more effectively by the employment of so-called mirror gangs —that is, four men with rail inspection mirrors working under the direction of a foreman or assistant foreman. The amount of inspection done by mirror gangs depends on the case history or record of failures on each individual section of track. It is obvious that all of the track cannot or need not be inspected by this method, as for instance the extensive mileage of controlled-cooled or thermally-treated rail in which no fissures and few if any head failures have occurred.

Mirror inspection supplements detector car testing, and should be done about midway between the detector car tests. The mirrors are effective in locating cracked or broken-out fissures; vertical split heads, which develop as longitudinal cracks or rust streaks in the fillet beneath the head; horizontal split heads; split webs; and rails in which engine burns, shelly or head check conditions are in the process of horizontal or transverse development.

Our experience with gangs established specially for mirror inspection has been that they can do this work more effectively than by passing the mirrors from one section gang to another. The men become specialists as their eyes become trained and accustomed to the indications or symptoms of the defects, as well as the variations of light and reflection in the mirrors.

Base or half-moon breaks are rarely detected by the detector car. However, track forces are given warning, usually in advance of the piece breaking out, by a crescent shaped rust streak on the top of the rail flange. Bolt-hole breaks cannot be found in advance by the section forces, and, of course, are not indicated by the detector car. However, if the joints are to be taken apart for any reason, such as out-of-face replacement, or for other purposes, careful inspection should be made for any indications of cracks or checks within the joint bar area.

The main point that I wish to stress is the necessity for constant vigilance on the part of section forces for broken or defective rails, supplemented by mirror inspection by special gangs in territories where failures are prevalent. The mirrors

Send your answers to any of the questions to the What's the Answer Editor. He will welcome also any questions you wish to have discussed.

To Be Answered in March

1. *To what extent and in what ways should additional supervision be provided to compensate for the quality of labor now available? For what classes of work?*
2. *To what extent is it feasible to employ women in building work? In bridge work? For what tasks? Is preliminary training necessary? How should this be given?*
3. *When laying rail, should the bolts be drawn to a high or a low tension? Why? Does this differ with different designs of joints? What effect will this have no subsequent tightenings?*
4. *To what extent can salvaged materials be re-used in the maintenance of trestles? What precautions are necessary?*
5. *In view of the shortage of lumber, are there any substitutes that can be used to repair plank crossings? If not, what expedients can be adopted to maintain such crossings satisfactorily for the duration?*
6. *What measures should be taken to prevent deterioration and thus conserve the life of fire hose? Who should be responsible?*
7. *To what extent should foremen or operators be expected or permitted to repair or make operating adjustments on motor cars? On other types of work equipment? Why?*
8. *In view of the continued critical situation as regards lumber, what substitutes can be used or methods employed to maintain or carry over planked floors and platforms which are subjected to heavy trucking?*

aid in locating defects which cannot be found by ordinary visual inspection. Sole reliance should not be placed on testing by the rail detector cars, and no relaxation on the part of supervisory or section forces can be permitted in anticipation of detector car testing.

Foremen Are Responsible

By George Stafford
Section Foreman, Canadian National, Redland, Alta.

With wartime traffic density mounting steadily and a totally inadequate amount of new rail available to meet their requirements, maintenance men are faced with the responsibility, through diligence in inspection, of insuring that rail failures will be detected before accidents occur that will interrupt traffic. Therefore, irrespective of the fact that a detector car has been operated over the territory annually, for twice or even three times a year, it is important that section foremen be required to make a detailed inspection of their rail for indications of approaching failure at intervals of such frequency that an unsafe condition will not develop.

No arbitrary rule can be laid down for the frequency of such inspections, for this will depend on the density, speed and nature of the traffic and the physical condition of the rail in the territory concerned. Such inspection should involve thorough examination of the head, web and base of each rail in the track. In general, it may be stated that any unusual discoloration in the brightness of the top of the rail or any suspicious rust streaks or marks should be examined closely for indications of impending failure. A study of the history of the rail and perusal of the rail failure reports over a period of years will indicate the type of defects most prevalent in a certain locality.

It should be emphasized that several types of defects, particularly those occurring in the base and web of the rail, are beyond the scope of the detector car. On the other hand, it should not be assumed that, because of the high standard of efficiency attained by the detector car in locating defects in the head of the rail, detailed inspection can be relaxed for such potential failures as transverse fissures, head checks, horizontal split heads and vertical split heads.

When making a detailed inspection of rail, two men can work to advantage, one on either side of the rail, in examining the base and web for possible defects, the foreman himself giving attention to the rail head. The assistants should be instructed to bring to the attention of the foreman signs of any cracks, flaws, blemishes or suspicious marks that they find on the surface of the rail in order that he may examine them. Necessarily, the examination must be conducted on foot.

Constant Vigilance Needed

By W. H. Sparks
General Inspector of Track, Chesapeake & Ohio, Russell, Ky.

One cannot discuss this subject without giving due credit to the rail failure detector car. It is a marvelous machine and does a wonderful job. The defects discovered by this car have prevented thousands of wrecks. Nevertheless, the detector car has its limitations and is not perfect. There are some types of defects in the base of rails and in the joints that it normally does not discover; the car may also fail to locate transverse fissures at such special locations as in switch points, in stock rails, in the running rails alongside guard rails, etc. It is also difficult for the car to locate defects under wheel burns. However, it is constantly being improved to make it more sensitive and reliable in locating head defects in all locations.

Despite the efficiency of the detector car, transverse fissures sometimes develop rapidly between trips, and because of this, and because some defects are not easily found by the car, all foremen and section men should be constantly on the lookout for defective rails. They must watch for anything that looks unusual, such as shelly spots on the gage side of the ball, black spots, streaks along the top of the ball, rust streaks under engine burns or at any point under the ball, bends caused by improperly counterbalanced locomotives, or in short, any condition that looks unusual or different from the normal color or condition of the rail.

The best method of inspecting the track is to walk over it, because this provides opportunity to note the condition of all parts of the track structure, including spikes, bolts, joints, switches, etc. Today, when so much depends upon the uninterrupted flow of traffic, the track cannot be watched too closely. The foremen and all section men should realize their responsibility fully.

Centralized Pre-Cutting of Lumber

What are the advantages and disadvantages of pre-cutting lumber for buildings at a central point? Does this conserve materials? Why? Is it feasible to pre-cut lumber for repairs? Why?

No Advantages

By V. E. Engman
Chief Carpenter, Chicago, Milwaukee, St. Paul & Pacific, Savanna, Ill.

There are few advantages and no net savings to be realized in pre-cutting lumber for building construction work. As a general rule, all lumber for either new construction or for repair work is purchased in stock sizes or is prepared to the required thickness and width at a mill. If lumber is ordered carefully as to length and the carpenters use the lengths to the best advantage, there should be very little waste.

Field forces are quite universally equipped with power-driven saws and cutting can be done at the site nearly as economically as at a shop. Any savings that may be made in labor or material by pre-cutting at a central point are more than off-set by the extra labor required to sort a shipment of the pre-cut pieces.

Neither is it feasible to pre-cut lumber for repair work, for too much time is required to get the measurements for the order. Repair material is usually delivered in carload lots and in most cases the carload contains material for many jobs. Sorting the shipment to find the right pieces consumes much time.

Depends on Structure

By W. C. Harman
Supervisor of Bridges and Buildings, Southern Pacific, San Francisco, Cal.

There are few disadvantages in pre-cutting lumber at a central point, provided it is for standard buildings or for several buildings of the same type where, through experience, the mechanics become proficient. This is true in any line of construction. There is always some advantage in

pre-cutting lumber for any type of building but the greatest advantage lies in mass production of the smaller standard buildings, such as bunkhouses, portable camp units, outhouses, locker buildings, flagmen's towers, powder houses, etc. These types of buildings are most widely used over a system.

It is difficult, however, to find any advantage in pre-cutting lumber for large station buildings, shops, roundhouses, store or office buildings. Such buildings do not conform strictly to standards and their design is governed by local conditions, among which are the number of men, machines or equipment to be housed.

Frequently the influence of civic pride and the dictates of building or fire ordinances make changes necessary during the construction of these larger buildings so that the pre-cut lumber may become unusable at the site. Also large buildings require such large amounts of lumber that the advantages of pre-cutting may easily be offset by loss in the too-frequent handling of such large quantities of materials. On most large jobs it is more economical to cut the material with power tools at the site, as most contractors now do.

However, in pre-cutting lumber for standard small buildings, there is no question about the savings in material and labor. The greatest economy is, of course, in labor, due to the use of many modern machines such as saws, planers, mortising machines, augers and similar equipment, which save many man-hours. At this point will also be found automotive carriers, hoists, derricks and conveyors for handling lumber to and from and in the mill. Here the members of the structure are neatly and truly cut to fit by the machines, eliminating much lost time in the field.

The saving of material lies in the use of proper grades, inferior lumber being cut for the shorter lengths, while waste is reduced to the minimum. Cut-offs and mill-ends can be used in the mill, whereas in the field they might be wasted by burning.

Where it is necessary to use treated lumber it is first milled, bored if needed, and finally treated, making unnecessary further cutting at the site which otherwise might expose the untreated wood to the attacks of termites and decay.

Rewards for Safety Records

In view of the relaxed requirements in hiring men, to what extent, if any, is it advisable to give consideration to special rewards for good safety records, or discipline for violation of rules and lax supervision? Why? How should the one be awarded and the other administered?

Should Reward Records

By G. S. Crites
Division Engineer, Baltimore & Ohio, Baltimore, Md.

The safe man reaps his own personal reward, but good safety records deserve consideration. Most agreements with employees, however, state that "except as provided in these rules, no compensation will be allowed for work not performed," and this technically prohibits special rewards of money for safety records.

The discipline record of an employee, however, can be used to give recognition for outstanding work and behavior and for good safety records. When an employee has a record for one, two, five, ten or more years of no injury to himself or to others due to his fault, he should be given special recognition by card, button or otherwise, and an entry made on his personal record.

Conversely, discipline should be applied and the fact of such discipline entered on the employee's personal record, for violation of or lax administration of safety rules.

Favors Contests

By Frank Cizek
Superintendent of Safety, Delaware, Lackawanna & Western, New York

It is somewhat difficult to reward individuals for good safety records, desirable as this may be, but I firmly believe in rewarding the head of a department, a division or any large group of employees when they excel in reducing their injuries and achieve the best record for the year. This can be done by safety contests and on our railroad we conduct annual safety contests among the employees under the jurisdiction of the following officers: Division superintendents; master mechanics and shop superintendents; roadmasters and the heads of the engineering department; freight agents in metropolitan districts; and line freight agents on the larger or important districts. The award may be a plaque or merit certificate, which is presented to the head of the winning department by the president of the road at a large gathering of officers and employees, shortly after the first of the year.

While the prize may have little intrinsic value, the calling forth of the winners before a large gathering of their fellows, and the words of commendation and encouragement of the president for important work well done, are sufficient reward and go a long way to encourage others to emulate their example another year.

Disciplining employees for violation of safety rules is a much mooted question. I believe that encouragement saves more souls in injury prevention than discipline, and I favor the latter only in flagrant cases. We need more earnest leadership on the part of supervisory officers, particularly now when so many of what may be termed undesirable people are entering railroad service. They are lacking in experience, are beyond our age limit, and sometimes are not in the best physical condition. They must be led carefully and looked after to avoid injuries.

Answer Is No

By D. X. Greenberg
Assistant Engineer, Missouri Pacific, Wichita, Kan.

The question which arises in my mind in connection with rewards for safety records, so far as the rank and file of workers on the railroads is concerned, is "Do they want a special reward?" My answer, based on association with employees on various divisions of our railroad, is "no." Should they be disciplined for laxity or violations of safety rules? My answer again is "no."

On our railroad, the challenge to all employees to work safely is not a matter of reward or compensation, and if one, through his own carelessness, is unfortunate enough to become hurt, even though he has violated a safety rule, or another has suffered through lack of or laxity in supervision, discipline is not administered. I believe that it is the employee's duty and obligation when he first enters service to understand that safety to himself and to others comes first in performing his work, and if an employee must be disciplined to carry out or enforce the rules of safety, he is certainly an unfit employee.

Rather than rewarding an individual for an excellent safety record, which might create ill feeling if one employee secured a better rating or special award, than another, it is my contention that if a specific group, such as those comprising the various branches of service on a division, work toward establishing a record of the least number of injuries, that group should be rewarded with a special citation by the management, wherein the entire group shares alike. In other words, each employee included in the group will feel as if he has done his small bit, in teamwork fashion, to accomplish the greater reward for the division and it goes without saying that a bad record in safety work on any particular division will be shared similarly by all, in an adverse manner.

Using Tamping Outfits in Winter

In what ways can tie-tamping equipment be used to advantage during the winter?

Have Many Uses

By W. H. Sparks
General Inspector of Track, Chesapeake & Ohio, Russell, Ky.

There are many tasks for which tamping outfits can be used during the winter, when the ballast is frozen too hard to permit surfacing work. The compressors with spike drivers can be used for laying new or relay rail during the winter months. They can also be used with tamping tools, equipped with modified blades, for scaling stone bluffs where slides or rock falls might endanger the track. Compressors with wrenches can be used to remove lag screws from track on which the rail is to be relaid the following spring.

Where concrete platforms are to be replaced or crossings must be removed, repaired or cleaned of ice, pneumatic tampers equipped with paving breaker blades or modified tamping blades can be used. In fact, they can be used to advantage at any point where frozen earth and ice must be removed, without using powder or dynamite to loosen the material.

Should Use All Year

By C. R. Knowles
Superintendent of Water Service (Retired), Illinois Central, Chicago

This question deals with an important phase of the scheduling of the use of work equipment, as it is directed toward securing the maximum benefit from the ownership of such equipment. This subject is of particular importance at this time when it is difficult, if not impossible, to obtain additional equipment.

Tie tampers have a potential availability for use on the track of 270 working days per year, after deducting 30 days for necessary overhauling. The actual time they are required on track work may be placed at 200 days. (This figure may be increased or decreased according to climatic conditions, and is not given as an average for the country as a whole.) This leaves a minimum period of 70 days in which this equipment is available for other work than tie tamping.

The value of tie tamping equipment has been demonstrated clearly in track work, and there is no reason why this should not be true of other work to which it can be adapted. Both pneumatic and electric tie tampers may be used to advantage in various maintenance of way operations, either as a unit including the tamping tools, or the power plant alone for operating air or electric tools.

An air compressor is one of the most versatile units of equipment on a railroad. Space will not permit listing all of the uses to which it is adapted, but to mention a few—the tamping bars may be replaced by drills, punches and chisels; it may also be used to operate rock drills, concrete breakers, and to remove ice and similar work. It may be used to operate air hammers, brushes, saws, drills, reamers, wrenches and chisels. It may also be used in sandblasting, spray painting, whitewashing, making shotcrete, pressure grouting, making repairs to concrete structures and placing concrete in tunnel linings. Portable compressors may be used to replace stationary compressors that are out of service for repairs or other reasons. They may be used also to clean and test wells and, in fact, in any operation where compressed air is required.

Electric tampers have more limited use although they have a certain field of versatility of operation. As with air tampers, they are useful in removing ice and they are adapted admirably to use in vibrating concrete. The power plant of certain types of electric tie tampers may also be used for the operation of such tools as saws, drills, reamers, wrenches and brushes, and for various types of lighting.

Power Tools for Trestle Work

With what power tools should a bridge gang engaged in maintaining timber trestles be equipped? For what operations on these structures is there an unfilled need for power tools?

Wider Application Needed

By C. R. Knowles
Superintendent of Water Service (Retired), Illinois Central, Chicago

Although there is a rather extensive use of power tools in the maintenance of timber trestles, the application of these tools is not general, and there is a wide field for the further mechanization of all bridge and building work.

There are very few operations in connection with the maintenance of timber trestles that cannot be performed by power tools. They are adapted to sawing, drilling and dapping timbers. They are also useful in running nuts on and off bolts and for driving lag screws, operating hammers and for lighting where electricity is used for power. The advantage in using power tools is that they offer worthwhile economies, and, what is more important, make it possible to do more and better work with fewer men.

Pneumatic tools have been used more extensively in this class of work in the past. This is because they were the first tools available, and have a broad field of utility. The ability of air tools to resist moisture and rough handling, together with their ability to stand up under overloading to the point of stalling, add to their popularity. Small portable electric power plants have come into general use more recently and are

well adapated to the operation of tools used in the maintenance of timber trestles.

Air-operated tools have certain advantages in that they have a wide field of use, for in many instances they may be used in drilling rock, sand blasting, spray painting, pressure grouting, placing concrete in tunnel linings and other work for which compressed air is particularly adapted. Also it is sometimes necessary to employ tools under conditions of extreme moisture, that might lead to difficulties if other types of power were used.

Electric tools possess the advantage over pneumatic equipment that they are lighter in weight, both as regards the power plant and the tools. The electric outfits adapted to bridge maintenance range in size from 2½ to 15 k.v.a. The size of the power unit is determined by the number of tools to be operated at any one time. For example, a heavy duty drill with a one-inch bit, or an eight-inch circular saw will require about one k.v.a. for its operation, while a 24-inch chain saw will require nearly three k.v.a., and a 12-inch circular saw less than two k.v.a. If used exclusively for lighting, a 2½ k.v.a. outfit is large enough for a division gang.

Many Tools Necessary

By F. H. Cramer
Bridge Engineer, Burlington Lines, Chicago

Power tools today are becoming a necessity for the efficient maintenance of timber trestles and more so in the restoration of structures in the event of washouts, burnouts or regular replacements. They offer opportunities for economies and without a doubt increase the speed with which work can be done, compared with hand methods.

Both air and electrically-driven portable power tools are applicable in this class of work and are an important factor in speeding up the work. Such equipment is adapted particularly to timber framing operations which can be done largely with power saws, wood augers, etc. Gangs should be liberally supplied with power equipment of this nature.

A recent development is the light-eight electric-generating unit, which can be handled on the job with little difficulty and which will furnish enough power to operate saws, drills, bolt machines, etc. The same type of tools are available, driven by air. A fair-size bridge gang should be equipped with a portable power unit —either an electric generator or an air compressor—or with direct-connected units, including two wood boring machines, one circular saw, one or two pile saws, one drill, one impact wrench and one power-wrench.

There has been a dislike on the part of the men to use power tools with the heavier type of power units, unless a large job is involved. Since the newer and lighter units are now available, all gangs should be supplied with full sets of power tools.

Protection Against Drifting Snow

In view of the density and importance of today's traffic, what special precautions against drifting snow are warranted at this time?

Must Prepare in Advance

By C. E. Miller
Assistant Engineer Maintenance, Chicago & North Western, Chicago

Heavy snow is the Nemesis of both the operating and engineering departments of all of the northern railroads under normal traffic conditions. At present, it is essential more than ever before that wartime traffic get through with the least possible delay and that locomotives be returned promptly to insure their full utilization in a period when all of the railroads are hard pressed.

To meet these conditions in a period of extreme labor shortage, it is of utmost importance to prepare in advance for combatting heavy snow storms. Such preparations must include not only having all units of snow fighting equipment in good condition and at their proper stations, but should also include the advance assignment of forces, with auxiliary supervision to relieve regular supervisors and foremen in storms of considerable duration.

Snow melters of various types loom large as a labor saving device, especially in congested terminal areas where much can be done by gas and electric heaters as well as by the various types of portable oil-burning heaters. Past experience should indicate to the supervisory forces where such equipment will be most needed and there should be no failure to have these devices at their proper locations and in good condition so that they may be put to use quickly in the early stages of a snow storm, for an excessive delay may result in an accumulation of snow that is beyond the ability of these devices to handle properly.

Within the last few years tractors and off-track weed mowers have come into rather extensive use on the railroads. These machines will handle a snow blade and should be so equipped, for they are very effective in plowing snow off platforms and driveways. But here again, it is important that they be put into service early and operated with sufficient frequency during the storm so that the accumulated snow does not reach a depth that is beyond the capacity of these machines.

Because of the labor shortage it may be advisable to hold small extra gangs within reach of important terminal areas throughout the winter. By proper planning and supervision, these gangs can be used in good weather on such constructive work as relaying yard tracks and various other maintenance operations and they will be readily available in case of heavy storms.

Out on the line the principal reliance will be on snow plows and other snow fighting equipment and on the regular section forces, but care should be taken to see that snow fences are in good condition and are located where most needed.

Must Be Ready

By J. B. Kelly
General Roadmaster, Minneapolis, St. Paul & Sault Ste. Marie, Stevens Point, Wis.

The ordinary depth of new snow does not challenge the operation of trains as much as bad flangeways, which, as a result of packed snow and ice, contribute to reduced traction of locomotives and cause stalling of trains. Switches can hardly be kept in satisfactory condition unless the ballast has been removed from the spaces between the ties directly underneath the switch points, guard rails and frogs, to a depth of four or five inches below the rail, thereby making it possible to clean the switches in a manner that will carry them for a reasonable time. At outlying switches and those that cannot be kept reasonably free from snow, a shovel and a

broom should be installed for the use of trainmen.

At this time, it would be a good plan to check the snow fence situation and where snow has been retarded to its capacity, portable fences should be raised, re-set or moved so that they will function effectively. The use of short stretches of picket fencing adjacent to key points at stations and in yards to act as snow fences, is worthy of careful consideration.

With these requirements in view, there is no doubt that a recheck of snow organizations would be profitable to insure that those responsible will act in time to avoid delays to traffic. It often occurs that snow equipment, such as crawler tractors equipped with dozers, team-drawn snow scrapers, power shovels and trucks are not started until after a blockade has developed, resulting in greater expense than if preliminary handling of snow had been accomplished. When advance preparation is not sufficient to withstand a storm, the forces should thoroughly understand that they will be expected to respond with the necessary additional equipment as needed.

To be prepared to avoid delays to transportation in the snow regions at this season, any obstruction that will cause drifting, such as mounds of snow piled up adjacent to street crossings, switching leads, station platforms, coaling and watering stations and junction facilities where passenger and freight trains do switching, must be kept cleaned up. Such cleaning should include the removal of the general depth of snow in and around the tracks to insure good flange ways. Any cinders deposited in tracks must also be removed promptly as they will cause ice to accumulate and create bad flangeways. Salt is an important aid in keeping the flangeways of street crossings in condition.

Salvaging Pump Parts

To what extent is it practical under normal conditions to salvage parts of pumps that are to be scrapped? Under present conditions? How can they be re-conditioned?

Parts Can Be Reclaimed

By C. R. Knowles
Superintendent of Water Service (Retired), Illinois Central, Chicago

The depression years taught us to save materials that in more prosperous times were consigned to the scrap pile and the necessity for greater effort toward salvaging usable materials has been further emphasized by war conditions. It is perhaps better to use the term reclamation rather than salvage as the many scrap drives have had a tendency to make the terms "salvage" and "scrap" synonomous, and in our zeal and haste to salvage all scrap possible we may sometimes be inclined to overlook the importance of reclamation.

There is this difference between reclaiming usable parts of pumps under normal conditions and at present. Under normal conditions, where repair parts could be obtained readily, the reclamation of parts from scrapped pumps was a matter of economy, while under present conditions it is one of necessity. If the reclaimed part can be used on other pumps, the question of cost is secondary, as in most cases it is impossible to obtain new parts.

Competent men familiar with the water department's requirements should be assigned the duty of inspecting all pumps before they are scrapped, with a view to reclaiming all usable parts for repairs to others. The reclamation of such parts should be done by a qualified mechanic, as all usable parts are machined and require the same skill in their recovery as in their application. Haphazard unskilled reclamation will invariably damage the parts beyond further use.

The work of selecting parts for reclamation requires good judgment as there is no advantage in saving parts of obsolete pumps, regardless of their condition, or parts in excess of possible requirements. Considerable should be given to the number of pumps in service that may require such parts. The condition of the parts to be reclaimed should also be considered, although the cost of reclamation, which is a factor to be considered under normal conditions, is of less importance at present.

The reclamation of the moving parts of pumps that are subjected to wear is perhaps of first importance; these include water-valve seats, stems and springs, both metal and rubber valves, cylinder liners, pistons and rods, crossheads, links and rocker arms. Cylinder heads, air chambers, steam and water valve chambers and covers are not subject to wear to breakage, and are of less value as repair parts.

Valve seats, stems and springs are interchangeable in pumps of the same size and type, and in some cases with other pumps. The seats may be reconditioned easily by refacing and, as a rule, stems and springs may be used again without repairs. Rubber valves are among the most critical materials. These can often be placed in service again without reconditioning. If they are not too badly worn or are not too thin, they can be refaced and used with valve plates. Cast iron and brass cylinder liners may be rebored, if they are not too badly worn or cut, using larger packing if necessary. Where cast-iron cylinder liners are lined with brass, they can be relined, and the pistons can be built up by brazing or metalizing and refinished. If not worn too-badly, rods can also be built up by metalizing or they may be cut down and used for smaller pumps.

Centrifugal and rotary pumps offer fewer possibilities for reclamation than those of the reciprocating type, as they have fewer parts and are not being replaced to the same extent. As a rule, they are not scrapped until the moving parts are completely worn out or become obsolete. As a result, few of them have parts worth reclaiming.

Many Have Been Retired

By J. P. Hanley
Water Service Inspector, Illinois Central, Chicago

Many steam displacement pumps have been retired in the last few years in favor of electrically-operated centrifugal pumps, through the use of city instead of company-pumped water and by reason of the abandonment of some intermediate water stations that are no longer needed because of larger capacity locomotive tenders which permit trains to operate with fewer water stops.

The steam displacement pump is the type most frequently retired and, because a relatively small number of those pumps still remain, the use of salvaged parts is not usually extensive. However, there are certain items, such as rubber pump valves, valve studs, valve springs, water pistons and water cylinders, that can be used on similar pumps without much reconditioning work. In fact, a reserve pumping unit is often

created by shopping the entire pump and using the spare unit thus created to replace another unit that should be shopped. This practice is recommended for divisions which can use the spare unit to advantage and have facilities for reconditioning.

Under present conditions the shopping and reconditioning of all types of pumps should be studied in the light of the scarcity of new equipment and all reasonable means should be used to salvage old pumps by reconditioning the entire unit, or, if no need exists for the pump as a whole, to salvage carefully all parts that can be used as replacements in other installations.

The reconditioning work is usually done in the division mechanical shops by means of a "shop order" requested of the shop forces by the water-works foreman. The water-works man usually keeps in touch with the shop foreman and assists in ordering necessary parts from the pump manufacturers' catalogs, when such parts cannot be made economically by the shop forces. The water-works man may also be in a position to draw on a stock of parts salvaged previously which he has stored for such repair jobs. Co-operation and a certain amount of supervision by the water-works man will improve the details of the work under the shop-order system.

While the steam pump is the unit that is being retired to the greatest extent, the general condition of salvaging also refers to centrifugal and other types of pumps which should be shopped as an entire unit, or such parts as may be needed should be reclaimed, and the remainder scrapped. However, under present conditions the steam pumping unit is generally scrapped, as it is becoming obsolete.

Programming Building Maintenance

Does the present difficulty in procuring materials, increase or decrease the desirability of programming building maintenance? How should past procedure be modified?

More Necessary Now

By E. H. Barnhart
Division Engineer, Baltimore & Ohio, Garrett, Ind.

The present difficulty of securing materials makes it more than ever desirable to program building maintenance. It is the practice of most roads at this time of year to set up a program or budget for building maintenance for the ensuing year. Owing to the difficulty of securing materials, it is doubly essential that this program be prepared and approved as far in advance of the working season as possible to permit the necessary materials to be ordered. Delivery of material is one of the serious difficulties now being experienced. Again, programs are highly desirable in order to line up labor when the working season starts.

Supervisory officers should look ahead as far as possible and plan and program their work so that sufficient time may be given for the delivery of materials. They should bear in mind that every industry is affected by labor and material shortages and recognize the fact that they cannot wait until they are ready to start a job and then expect to get the material from the storekeeper or the manufacturer. Materials which usually required 60 to 90 days for delivery can now seldom be secured in less than 6 to 9 months.

Management, too, has a responsibility that is often quite burdensome in these days. Building maintenance programs for the ensuing year were formerly submitted at the beginning of that calendar year. Quite frequently, the supervisory officers charged with carrying out these programs were not advised of the approval of these programs until three or four months of the new year had elapsed. It is readily seen that if this policy is pursued under present difficulties, it will mean that large portions of the program can not be completed until well in the fourth quarter, and possibly some projects may not be completed during the current year. Programs, should therefore be approved promptly and returned to the proper officers so that the requisite materials can be ordered.

In view of existing conditions, past procedure should be so modified as to recognize the delays incident to deliveries of material and the shortage of manpower by: (1) Preparing and submitting programs by December, for the following year. (2) Obtaining approval by management and the return of the approved program to supervisory officers by the first of the year. (3) Placing requisitions at once for materials, by the supervisory officer, for work to be done during the first half of the year. (4) Placing orders promptly by the management for such materials, taking delivery dates into consideration. (5) Closely following such material orders with the manufacturers to see that promises are kept. (6) Employing labor continuously throughout the winter months in order to have it available during the working season.

During the present acute material and labor shortage, the supervisory officer must follow closely each item of work and co-ordinate his labor with his material.

Programming Essential

By Bridge and Building Supervisor

Because of labor and material shortages, it is becoming more and more difficult to complete each season all the work that should be done and, in fact, we are now doing only work that is most essential. With so much dependent upon the railroads today, it is necessary, however, that all work affecting operating efficiency be done currently in order that nothing be permitted to slow down the delivery of supplies to war plants or the war fronts. To insure that that which is most essential will be done requires more than ever before that a program be laid out.

As soon as such a program is decided upon, it is also essential that material be ordered, so that it may be received as soon as possible during the working season next year. It is desirable, of course, that delivery dates be assigned and that supervisory officers and management see to it that manufacturers live up to them. By programming carefully and ordering far enough in advance, these delivery dates should be met. This will permit the year's program to be carried out in an orderly manner, barring emergency work, which will, in turn, permit the most efficient utilization of the labor available.

In programming building maintenance and ordering materials for the work, non-critical substitutes for critical materials should be used whenever possible. Unfortunately, lumber has now become the most critical material and in most instances, repair work on frame structures requires the use of lumber. In some cases, it may be possible, however, to use, for example, materials such as concrete and gypsum wallboard, which are not critical. Fortunately, the situation in steel is easing rapidly and it may be possible soon to secure steel roof trusses, columns, etc., for important structures without delay.

NEWS of the Month

Eastman Says Transport Not Over Hump

Declaring that the railroads have done a "superlative job" in handling the ever-increasing war loads, Joseph B. Eastman, director of the Office of Defense Transportation, said in a recent press conference that there are worse months ahead in the battle to maintain adequate transportation facilities at wartime tempo. Mr. Eastman said that the transportation industry wanted to show what private enterprise could do and "they have shown, for management and operation has been in their hands. Nevertheless, they are not over the hump." The ODT Director explained that he looked forward to the months immediately ahead as "the worst so far, and I hope the worst there will be."

Illinois Central Gets Safety Award

Because the Illinois Central made the greatest reduction in total employee casualty rates of any major railroad during the first seven months of 1943, officers of that road have been presented with the distinguished service and safety award of the National Safety Council. This marks the first time that such an award has been made to a railroad for this type of accomplishment.

On a basis of a million man-hours worked, the Illinois Central's ratio of personal injuries has dropped from 9.18 during the first 10 months of 1942 to 6.88 for the same period of 1943. The record was established in the face of increases in the number of employees and man-hours worked.

Outlook Improves For More Railroad Equipment

There will be an improved situation in 1944 with respect to the production of railroad equipment and supplies, according to a recent statement of Director Joseph B. Eastman of the Office of Defense Transportation, extending even to the possible acquisition of some new passenger cars. Mr. Eastman's statement was made during a press conference on December 20 when the ODT director explained that his outlook was based on such favorable developments as the easing materials situation, plans for better control of production schedules to minimize "slippages" which have made themselves felt in the past, and President Roosevelt's executive order continuing under War Production Board authority arrangements to amortize war facilities over a five-year period.

Department of Justice Sues Four Rail Joint Reforming Companies

A civil suit against four corporations and their presidents, alleging violations of Sections 1 and 2 of the Sherman Act in the rail joint bar reforming industry was filed by the Department of Justice in the Federal District Court at Chicago on December 21. Those named as defendants are The Rail Joint Company, New York, and its president, Victor C. Armstrong, Short Hills, N.J.; Poor & Co., Chicago, and its president, Fred Poor, Lake Forest, Ill.; the Woodings-Verona Tool Company, Verona, Pa., and its president, Emanuel Woodings, Verona; and the McKenna Process Company, Joliet, Ill., and its president, George Langford, Joliet.

The suit seeks a cancellation of certain license agreements among the four companies and a public dedication of the unexpired patents. It also asks that the defendants be "restrained from instituting any action, including those for royalties or for infringement of patents, on the basis of rights claimed under any of the agreements or licenses."

Name Patterson I. C. C. Chairman

The Interstate Commerce Commission last month announced that Commissioner William J. Patterson has been elected chairman for the calendar year 1944, succeeding Commissioner J. Haden Alldredge, whose stated term expired on December 31. Commissioner John L. Rogers, who by seniority in service was next in line for election to chairman, was unable to undertake the added duties of that office since he is serving also as assistant director of the Office of Defense Transportation. In the meantime, Joseph B. Eastman and Commissioner Rogers have been reappointed by President Roosevelt as members of the Interstate Commerce Commission for new terms, expiring on December 31, 1950. The reappointments were sent to the Senate on December 2 and are expected to ratified shortly.

Seeks to Liberalize Tax Law on Deferred Maintenance

Representative Buffet, Republican, of Nebraska, has introduced H. R. 3794 for the purpose of "creating a stock pile of post-war work by facilitating deferment of current maintenance." The bill would amend the Internal Revenue Code by inserting a new section with provisions for the carry-back of deferred maintenance.

Pullman Has Transported 17,000,000 Troops in Two Years

Pullman sleeping cars have transported approximately 17,000,000 members of the armed forces in the last two years, according to a report released last month by George A. Kelly, vice-president of the Pullman Company. In order that the company's fleet of 7,000 cars could be distributed expeditiously, its distribution department has been obliged to operate on a 24-hour schedule for some time.

Government Takes Possession of Railroads

At 6 p.m. on December 27, as a result of three operating unions threatening to strike, President Roosevelt ordered emergency seizure of the railroads by the U.S. Army, with the blunt warning that "If any employees of the railroads now strike, they will be striking against the Government of the United States—The Government will expect every railroad man to continue at his post of duty."

This action came after all of the 15 non-operating unions and two operating unions, the Brotherhood of Railway Trainmen and the Brotherhood of Locomotive Engineers, had withdrawn their strike threat. These two operating unions had also accepted President Roosevelt's offer of personal arbitration of their wage demands, while the non-operating unions reported that they had reached substantial agreement with the carriers. The three other operating unions, however, the Brotherhood of Locomotive Firemen and Enginemen; the Switchmen's Union; and the Order of Railway Conductors, allowed their strike call for December 30 to stand at the time the President ordered the Army to take over the railroads. The President signed the order at 5 p.m., giving Secretary of War Stimson only one hour's notice. On December 29, the three operating unions agreed to call off the strike.

Personal Mention

General

Everette A. Craft, assistant to the executive vice-president of the Southern Pacific Lines in Texas and Louisiana, and an engineer by training and experience, has been promoted to vice-president, with headquarters as before at Houston, Tex.

Chester A. Johnston, superintendent of the Decatur division of the Wabash, and an engineer by training and experience, has been promoted to superintendent of transportation, with headquarters at St. Louis, Mo.

Bert J. Simmons, engineer maintenance of way and structures of the Western Pacific, with headquarters at San Francisco, Calif., has been promoted to assistant to the general manager, with the same headquarters.

L. E. Thornton, superintendent of the Baltimore & Ohio Chicago Terminal, and an engineer by training and experience, has been granted a leave of absence to serve as lieutenant-colonel of the 741st Railway Battalion, U. S. Army, for service abroad.

James F. Nellis, trainmaster on the Decatur division of the Wabash, with headquarters at Decatur, Ill., and an engineer by training and experience, has been promoted to superintendent of the St. Louis Terminal division, with headquarters at St. Louis, Mo., effective December 1.

Robert J. Yost, trainmaster on the Atchison, Topeka & Santa Fe at Chillicothe, Ill., and a maintenance officer by training and experience, has been promoted to superintendent of the Missouri division, with headquarters at Marceline, Mo. Mr. Yost was born at Lockport, Ill., on July 31, 1893, and entered railway service with the Santa Fe on November 1, 1911, as an extra gang timekeeper at Joliet, Ill. On April 1, 1913, he was advanced to assistant track foreman of the Illinois division, and three years later he was promoted to roadmaster, with headquarters at Chillicothe, Ill. On July 1, 1938, Mr. Yost was advanced to trainmaster, with the same headquarters, holding that position until his new appointment, which became effective December 5.

Hugh L. Bell, assistant superintendent of the Victoria division of the Southern Pacific Lines in Texas and Louisiana, and an engineer by training and experience, has been promoted to superintendent of the Dallas and Austin divisions with headquarters at Ennis, Tex. Mr. Bell was born at Piedmont, Okla., on July 21, 1894, and received his higher education at Oklahoma University and Rice Institute. He entered railway service on November 3, 1919, as a cost estimator in the office of the chief engineer of the Southern Pacific Lines in Texas and Louisiana at Houston, Tex., and one year later he was advanced to assistant engineer of the Shreveport division, with the same headquarters. In September, 1921, he was promoted to roadmaster of the Lufkin district, with headquarters at Lufkin, Tex., and in January, 1924, he was advanced to division engineer of the Shreveport division, with headquarters at Houston. In 1925 Mr. Bell was transferred to the Beaumont division, with the same headquarters, and in January, 1928, he was promoted to assistant superintendent of that division. In April, 1933, he was appointed trainmaster of the Houston division, with headquarters at Houston and in December, 1935, he was advanced to division engineer of the Victoria division, with headquarters at Victoria, Tex. In March, 1942, he was promoted to the position he held at the time of his new appointment, effective December 1.

Engineering

Angus Stirling Gunn, engineer right of way of the Atlantic region of the Canadian National, with headquarters at Moncton, N.B., has been appointed principal assistant engineer of that region with the same headquarters.

M. J. McKenzie, assistant to the chief engineer of the Southern Pacific Lines in Texas and Louisiana, with headquarters at Houston, Tex., has been appointed assistant chief engineer, a change of title. The position of assistant to the chief engineer has been abolished.

E. M. Roberts, supervisor of bridges and buildings on the Illinois division of the New York Central, with headquarters at Anderson, Ind., has been promoted to assistant engineer, with headquarters at Mattoon, Ill., succeeding **L. W. Moss,** who has been granted a leave of absence to enter military service. **L. H. Riser,** assistant engineer at Mattoon, has been transferred to the district engineer's office at Cincinnati, Ohio.

C. A. Combs, general supervisor of bridges and buildings on the Western Pacific, with headquarters at Oakland, Calif., has been promoted to engineer maintenance of way and structures, with headquarters at San Francisco, Calif., succeeding **Bert J. Simmons,** whose promotion to assistant to the general manager is reported elsewhere in these columns. The position of general supervisor of bridges and buildings has been abolished and the duties of that position will be assumed by the engineer maintenance of way and structures.

George E. Robinson, assistant engineer of structures of the New York Central, Lines West of Buffalo, with headquarters at Cleveland, Ohio, has been promoted to assistant engineer of structures, New York Central System West of Buffalo (including the Michigan Central and the Big Four), with headquarters at Chicago, a newly-created position. **A. M. Westenhoff,** assistant engineer of bridges, Lines West of Buffalo, with headquarters at Chicago, has been advanced to assistant engineer of structures, Lines West of Buffalo, with headquarters at Cleveland, succeeding Mr. Robinson.

Henry E. Smith, whose appointment as district engineer on the Canadian National, with headquarters at Toronto, Ont., was reported in the December issue, of *Railway Engineering and Maintenance,* was born on May 4, 1894, at Ottawa, Ont. He obtained his higher education at McGill university, graduating in civil

Henry E. Smith

engineering in 1917. He entered railway service on May 1 of that year with the Grand Trunk (now part of the Canadian National), but in the following year he entered military service and served overseas with the Canadian Siege Artillery. On June 1, 1919, he returned to the Grand Trunk as assistant engineer at Montreal, Que., being advanced to division engineer at Richmond, Que., on February 28, 1928. On November 1, 1931, he became assistant division engineer at Allandale, Ont., and on August 25, 1937, he was appointed division engineer at Capreol, Ont., being transferred to Belleville, Ont., on February 1, 1940. In the following year, he was transferred to the chief engineer's office at Toronto as assistant engineer, and on March 17, 1943, he became acting district engineer of the Ontario district with the same headquarters. His appointment as district engineer became effective on November 1.

C. F. Edwards, assistant division engineer on the Chesapeake & Ohio, with headquarters at Columbus, Ohio, has been promoted to division engineer with the same headquarters, to succeed **W. L. Roller,** deceased. **M. J. Hubbard** has been appointed assistant division engineer at Columbus to succeed Mr. Edwards.

Alphonse M. Westenhoff, assistant engineer of bridges on the New York Central, Lines West of Buffalo, with headquarters at Chicago, has been promoted to assistant engineer of structures of the New York Central, Lines West of Buffalo, with headquarters at Cleveland, Ohio. Mr. Westenhoff was born at Cincinnati, Ohio, on March 15, 1892, and graduated from the University of Cincinnati in 1914. He entered railway service with the Cleveland, Cincinnati, Chicago

& St. Louis (Big Four), on January 1, 1918, in the office of the chief engineer at Cincinnati, and in 1922 was transferred to Van Wert, Ohio, on construction work between Sidney, Ohio, and Bellefontaine. In 1927 Mr. Westenhoff was transferred

Alphonse M. Westenhoff

to Dayton, Ohio, on track elevation work, and in 1930 he was transferred to the chief engineer's office at Cincinnati. In 1940 he was promoted to the position he held at the time of his new appointment.

E. H. McGovern, whose promotion to district engineer of the New York Central, with headquarters at Cincinnati, Ohio, was reported in the November issue, was born at Cincinnati and entered railway service in 1910 in the construction

E. H. McGovern

department of the New York Central. In 1917 he was granted a leave of absence to serve in the armed forces, returning in 1919 as division engineer, with headquarters at Mt. Carmel, Ill. A short time later Mr. McGovern was transferred to the St. Louis division, with headquarters at Mattoon, Ill., and in 1938 he was transferred to Chicago. In June, 1941, he was promoted to assistant district engineer, with headquarters at Cincinnati, holding that position until his new appointment, effective November 1.

G. H. Beasley, whose promotion to assistant engineer in the chief engineer's office of the Louisville & Nashville, was reported in the December issue, was born at Williamstown, Ky., on September 29, 1894, and graduated from the University of Kentucky in 1917. He entered railway service on January 1, 1910, as an instrumentman on the Eastern Kentucky division of the L. & N. with headquarters at Ravenna, and on March 16, 1923, he was advanced to draftsman in the office of the chief engineer at Louisville. On June 16, 1924, he returned to the Eastern Kentucky division as senior instrumentman, and on July 1, 1925, he was promoted to assistant division engineer, with the same headquarters. On September 4, 1937, Mr. Beasley was advanced to division engineer at Ravenna, holding that position until his new appointment became effective on October 1.

E. R. Shultz, whose promotion to engineer maintenance of way on the Northwestern district of the Pennsylvania, with headquarters at Chicago, was reported in the December issue, was born at Kimmel, Pa., and graduated from Pennsylvania State College in 1924. He entered railway service in June, 1924, as an assistant on the engineering corps of the Pennsylvania at New Castle, Pa., and in 1927 was promoted to supervisor of track, with headquarters at Pittsburgh, Pa., and later at Alliance, Ohio. From 1930 to 1940, Mr. Shultz served on the Cleveland, Panhandle, Middle, Wilkes-Barre and Philadelphia divisions and in September of the latter year he was promoted to division engineer of the Columbus division, with headquarters at Columbus, Ohio. In January, 1942, he was transferred to the Philadelphia division at Philadelphia, Pa., and in April, 1943, he was transferred to the office of the chief engineer, with the same headquarters, remaining in that position until his new appointment became effective on November 16.

Roy P. Hart, bridge engineer of the Missouri Pacific has been promoted to

Roy P. Hart

assistant chief engineer, with headquarters as before at St. Louis, Mo., succeeding **Samuel L. Wonson,** whose death on October 1 was reported in the November issue. **John R. Showalter,** assistant engineer at St. Louis, has been advanced to bridge engineer, with the same headquarters, replacing Mr. Hart.

Mr. Hart was born at Springfield, Mo., on February 14, 1892, and graduated in civil engineering from the University of Missouri in June, 1913. He entered railway service with the Missouri Pacific at Omaha, Neb., on June 7, 1913, as timekeeper for a system steel erection gang, later serving as assistant foreman and inspector on various bridge construction projects and as a draftsman, estimator

John R. Showalter

and designer in the bridge department at St. Louis. In November, 1919, he was promoted to chief draftsman and in February, 1931, he was advanced to assistant engineer. In the fall of 1938 he was advanced to assistant bridge engineer, and in February, 1941, he was promoted to the position he held at the time of his new appointment.

Mr. Showalter was born at Kokomo, Ind., in 1884 and graduated from De Pauw University in 1906. He entered railway service in 1911, as a district bridge inspector on the Baltimore & Ohio at Wheeling, W. Va., and in 1913 he was appointed system bridge inspector on the Missouri Pacific, with headquarters at St. Louis. Five years later he resigned to become superintendent of construction of the I. E. Smith Construction Company, Richmond, Ind. In 1929 Mr. Showalter returned to the Missouri Pacific as assistant engineer in charge of field supervision of system bridge gangs, with headquarters at St. Louis, holding that position until his new appointment.

F. E. Weise, chief clerk of the engineering department of the Chicago, Milwaukee, St. Paul & Pacific, with headquarters at Chicago, retired on January 1 after 54 years service with that road. Mr. Weise was president of the American Railway Bridge and Building Association in 1920, was treasurer of the Association in the years 1941 to 1943, and was elected treasurer emeritus at the last annual meeting of the Association in October, 1943.

Prentice L. Graves, whose appointment as district engineer on the Chesapeake & Ohio, with headquarters at Huntington, W. Va., was reported in the December issue, was born on August 13, 1895, at Austin, Tex. Mr. Graves obtained his higher education at the University of Texas, and entered railway service in June, 1916, as a rodman with the Houston & Texas Central (now part of the Southern Pacific). In September of the same year, he went with the Gulf Colorado & Santa Fe as a computer at Galveston, Tex., leaving this com-

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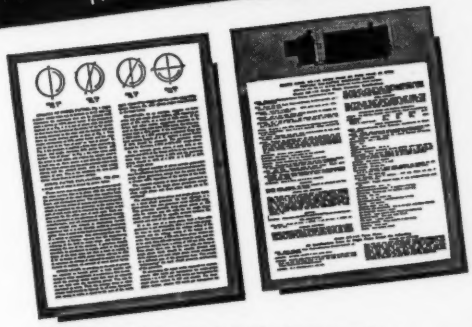

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pany several months later to become a draftsman with the Galveston, Houston & Henderson. In October, 1917, he entered military service with the 23rd Regiment of Engineers and served in France until Sep-

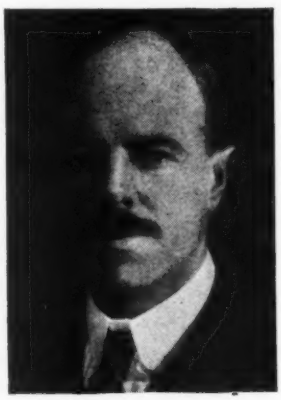
Prentice L. Graves

tember, 1919. He then entered the service of the Chicago, Burlington & Quincy as a computer at Chicago, serving with this company until October, 1920, when he went with the C. & O. as a draftsman on new line construction. In January, 1922, Mr. Graves entered the service of the city of Richmond, Va., returning to the C. & O. in March, 1923, as a resident engineer on construction work. He was serving in this capacity at the time of his recent promotion to district engineer, which was effective on November 1.

J. A. Irvine, whose appointment as district engineer of the Quebec district of the Canadian Pacific with headquarters at Montreal, Que., was announced in the December issue, entered the service of the Canadian Pacific in 1901 in the mechanical department, transferring to the engineering department later in that year. Thereafter he served at Chapleau, Ont., Woodstock, N.B., Kingston, Ont., and Montreal, Que. In 1913 he was appointed division engineer of the Ontario district with headquarters at Toronto, Ont., being transferred to London, Ont., in 1920. He served as division engineer of the Algoma district from 1929 to 1938, with headquarters at Schreiber, Ont., until 1933 when he was transferred to Sudbury, Ont. In 1938 Mr. Irvine became assistant district engineer, with headquarters at Montreal, and held this position until his recent promotion to district engineer with the same headquarters.

Howard C. Forman, whose promotion to division engineer on the Eastern Kentucky division of the Louisville & Nashville, with headquarters at Ravenna, Ky., was reported in the December issue, was born in Owen County, Ky., on August 11, 1895, and graduated in civil engineering from the University of Kentucky in 1920. He entered railway service in October, 1920, as an instrument man at Ravenna, and in 1927 he was advanced to draftsman and assistant engineer in the office of the chief engineer, with headquarters at Louisville, Ky. In December, 1931, Mr. Forman was transferred to Middleboro, Ky., and in September, 1937, he was advanced to assistant division engineer, with the same headquarters. In March, 1941, he was appointed assistant engineer in the office of the chief engineer, holding that position until his promotion became effective on December 1.

E. Y. Allen, whose promotion to chief engineer of the Reading, with headquarters at Philadelphia, Pa., was reported in the December issue of *Railway Engineering and Maintenance,* was born at Camden, N.J., and was educated at the Dearborn-Morgan School, Orange, N.J., and Princeton University (C. E., 1899). He entered railroad service in 1901 with the Long Island and was later employed by the Pennsylvania and the Hudson & Manhattan. In 1908 he was appointed town engineer for South Orange, N.J., and in 1909 became selling agent for railroad and mill supplies. During 1910 and 1911 he was office engineer, revaluation of railroads and canals, for the New Jersey State Board of Assessors, then going with the Maine Slate Company of Monson, Me. During 1912-1914 he was engaged in valuation work on several railroads and water works, and made special reports. From 1914 to 1919 he served as assistant valuation engineer of the Philadelphia & Reading (now Read-



E. Y. Allen

ing), later acting as valuation engineer of the Reading. He was appointed special engineer, engineering department in 1934. In July, 1938, he became assistant chief engineer at Philadelphia, the position which he held until his recent promotion to chief engineer with headquarters at Philadelphia.

Ruel E. Nottingham, whose promotion to assistant engineer in the office of the chief engineer of the Louisville & Nashville, with headquarters at Louisville, Ky., was reported in the December issue, was born at Colebrook, Ohio, on June 30, 1891, and graduated from Denison University, Granville, Ohio, in 1913. He entered railway service with the L. & N. on October 16, 1922, in the chief engineer's office and on January 29, 1923, he was advanced to instrumentman, with headquarters at Nashville, Tenn. On February 1, 1925, Mr. Nottingham was promoted to assistant engineer, with the same headquarters, and in December, 1933, he was advanced to assistant engineer and supervisor of track on the Nashville Terminal, later serving in the same capacity at Mobile, Ala. On October 14, 1941, he was pro-

Ruel E. Nottingham

moted to assistant division engineer, with headquarters at Birmingham, Ala., holding that position until his new appointment.

Lieutenant Colonel Daniel Hillman, whose retirement as district engineer, Quebec district, of the Canadian Pacific, with headquarters at Montreal, Que., was announced in the December issue, was born at Aldborough, Ont., on November 6, 1877. He entered railroad service in October, 1901, in the engineering department of the Canadian Pacific, serving successively as chainman, rodman, topographer, levelman, and transitman. Mr. Hillman was assistant engineer from 1905 to 1912, and was appointed division engineer in 1913. After military service in World War I, when he won his Distinguished Service Order with the railway troops of the Canadian Expeditionary Force, he returned in December, 1919, to the Canadian Pacific as assistant engineer of construction at Montreal, becoming engineer of construction in 1923. In 1933 he was appointed district engineer of the Quebec district, serving in that capacity until his recent retirement.

Track

G. T. Weida, assistant supervisor of track on the Eastern division of the Pennsylvania, with headquarters at Rochester, N.Y., has been transferred to the New York division, with headquarters at Trenton, N.J., to succeed **E. E. Zacharias,** who has been advanced to supervisor of track on the Delmarva division.

Algernon S. Dodge, assistant track supervisor on the Maine Central at Brunswick, Me., who has been promoted to track supervisor at Bartlett, N.H., as reported in the November issue, was born on May 13, 1897, at Newcastle, Me. He entered railway service with the Maine Central on April 7, 1916, as a rodman, being advanced to transitman on April 26, 1920, and to assistant roadmaster on November 17, 1926. His promotion to

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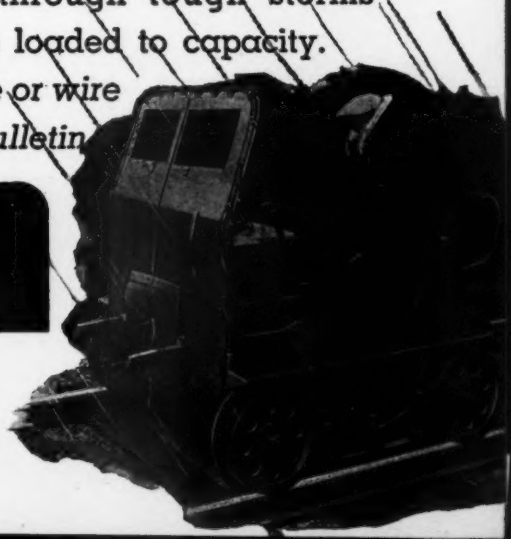

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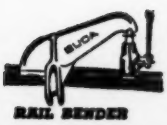

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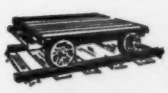

PUSH CARS

track supervisor at Bartlett became effective on September 15.

A. B. Dunning, instrumentman on the Illinois Central at Paducah, Ky., has been promoted to assistant engineer on the Mississippi division, with headquarters at Water Valley, Miss., succeeding R. W. Cowgill, whose death on November 9 is reported elsewhere in these columns.

Everett Belangee, section foreman on the Springfield division of the Illinois Central, with headquarters at Litchfield, Ill., has been promoted to acting supervisor of track, with the same headquarters, succeeding **L. E. Donovan,** who has been granted a leave of absence to enter the armed services.

Allen L. Sams, whose promotion to supervisor of track on the Illinois Central, with headquarters at Olney, Ill., was reported in the November issue, was born at Brownsville, Ohio, on July 9, 1917, and is a graduate of Purdue University. He entered railway service on June 10, 1941, as a chainman in the engineering department of the I. C., at Clinton, Ill., and on August 15, 1942, he was advanced to rodman, with the same headquarters. On November 1, 1942, Mr. Sams was promoted to assistant supervisor of track at Clinton, holding that position until his new appointment became effective on October 5.

Robert C. Williams, assistant roadmaster on the Missouri Pacific, with headquarters at Ferriday, La., has been promoted to roadmaster, with headquarters at Eudora, Kan., succeeding **F. Earney,** deceased. **D. B. Smith,** extra gang foreman on the Little Rock division, has been advanced to assistant roadmaster at Ferriday, replacing Mr. Williams.

L. J. Gilmore, whose promotion to general roadmaster, Lines West, of the Great Northern, with headquarters at Spokane, Wash., was reported in the December issue, was born at Superior, Wis., in July, 1892, and attended the University of Minnesota. He entered railway service in June, 1910, as a timekeeper in the track department of the Great Northern, subsequently serving as laborer, extra gang foreman and assistant roadmaster at various points on the road. During World War I, Mr. Gilmore served with the A.E.F. in France, returning to the Great Northern as district roadmaster in September, 1919. In November, 1925, he was advanced to the position he held at the time of his new appointment.

Jeter E. Stennett, assistant supervisor of track on the Chesapeake & Ohio, whose promotion to supervisor of track, with headquarters at Charlottesville, Va., was noted in the December issue, was born on October 15, 1900, at Maidens, Va. He entered railway service with the C. & O. on May 14, 1916, as a section laborer on the Richmond division, being advanced to section foreman on January 1, 1918, and to system track force foreman on May 19, 1934. Four years later he returned to the Richmond division as section foreman, being advanced to assistant supervisor of track of the Peninsula subdivision on January 11, 1943. He was holding this position at the time of his recent promotion to supervisor of track of the Piedmont and Virginia Air Line subdivision, which was effective on November 1.

Ebben J. Elston, supervisor of track of the Delaware, Lackawanna & Western, with headquarters at Elmira, N.Y., whose promotion to roadmaster with the same headquarters was announced in the November issue, was born on October 13, 1907, at Elmira. He entered railway service with the Lackawanna on June 18, 1927, as a track laborer, being advanced to assistant foreman in June, 1934. On July 1 of the latter year he became a curve liner and in December, 1935, he was promoted to extra gang foreman. For a period in 1938, he returned to the position of curve liner, then being again appointed extra gang foreman, with headquarters at Dover, N.J. In October, 1941, he was promoted to supervisor of track at Hoboken, N.J., being transferred to Buffalo, N.Y., in March, 1942. Subsequently, he was transferred to Elmira, where he was located at the time of his promotion to roadmasters, effective October 1.

Bridge and Building

Paul Haines has been appointed assistant bridge and building supervisor on the Toledo-Ludington division of the Pere Marquette, with headquarters at Saginaw, Mich., a newly-created position.

J. Oxenaar, assistant bridge and building master on the Port Arthur division of the Canadian National, has been promoted to acting bridge and building master, with headquarters at Brandon, Man., succeeding **C. Sylvester,** who has been transferred to Fort Rouge, Man., replacing Charles Carver, deceased.

C. A. Hughes, bridge inspector on the Joliet division of the Elgin, Joliet & Eastern, with headquarters at Joliet, Ill., has been promoted to assistant superintendent of bridges and buildings, with the same headquarters.

Frank Duresky, Jr., assistant supervisor of bridges and buildings on the Chicago & North Western, with headquarters at Huron, S.D., has been transferred to Milwaukee, Wis., succeeding **Charles G. Frietz,** who has been transferred to Escanaba, Mich.

Special

Carl E. Russell, assistant supervisor of water service on the Chicago Terminal division of the Illinois Central, has been promoted to supervisor of water service of the Chicago Terminal division, with headquarters as before at Chicago, succeeding **A. N. Graham,** who has retired.

Obituary

Harry E. Tyrrell, chief engineer maintenance of way and structures of the Southern, Central Lines, with headquarters at Knoxville, Tenn., died following an operation on December 5. He was born at Philadelphia, in July, 1882, and entered railroad service with the Pennsylvania. He also worked on the Philadelphia & Reading, and the Norfolk & Western, and joined the Southern in 1906, holding various positions from that of transitman to supervising engineer at Washington, D.C. In 1915 he was appointed engineer maintenance of way of the St. Louis-Louisville district, and in 1934 he became chief engineer maintenance of way and structures, Central Lines, with headquarters at Knoxville.

Francis Boardman, for the past 17 years assistant manager of Grand Central terminal, New York, and an engineer by training and experience, died at New York on December 12.

R. W. Cowgill, assistant engineer on the Mississippi division of the Illinois Central, with headquarters at Water Valley, Miss., died in a hospital at Paducah, Ky., on November 9.

William K. McFarlin, railway construction engineer, who at one time was chief engineer of the Delaware, Lackawanna & Western, died on December 6 at East Orange, N.J. He was 83 years old.

J. S. Bassett, superintendent of the Little Rock-Louisiana divisions of the Missouri Pacific at Monroe, La., and an engineer by training and experience, died recently in a Baltimore (Md.) hospital following a lengthy illness.

Walter M. Dawley, retired engineer in the land and tax department of the Erie, whose death on October 3 was reported in the December issue, was born at Andersonville, Ohio, on January 24, 1866, and entered railway service as assistant division engineer of the Erie at Youngstown, Ohio, later being promoted to division engineer with the same headquarters. In July, 1907, Mr. Dawley was appointed to the position he held at the time of his retirement.

Design Manual for Timber Connector Construction.—The Timber Engineering Company, Washington, D.C., has published its 1943 edition of the TECO Design Manual for Timber Connector Construction, in which the data presented are drawn in accordance with the recent WPB National Emergency Specifications for the Design, Fabrication, and Erection of Stress Grade Lumber and Its Fastenings, which became mandatory in November 1.

Skilsaw Catalog Features Upkeep Manual.—A large special section which is a war-time tool maintenance manual is a feature of a new catalog made available by Skilsaw, Inc., Chicago. The special section is headed How to Get The Most From Your Portable Electric Tools and was created to be a handy guide to greater production and longer life for electrical equipment.

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Association News

Metropolitan Maintenance of Way Club

The December meeting of the club was held at the Hotel Governor Clinton, New York, at noon on December 10, with 90 members and guests in attendance. Following luncheon, the meeting was addressed by R. C. Randall, general manager, of the Eastern district of the Erie, who spoke on What Management Will Expect of the Track Man in the Post-War Period.

Bridge and Building Association

An Executive committee meeting, called by President J. L. Varker, was held in Chicago on December 6, to review the names of members who volunteered for committee service and make tentative appointments to the committees which will study and report on the subjects selected for consideration at the next annual meeting. Consideration was also given to a number of routine association matters, including plans for the publication of the 1943 Proceedings and the status of the membership.

Maintenance of Way Club of Chicago

One hundred and thirty-one members and guests attended the meeting on December 20 which was held in the Ambassador room of Huyler's restaurant in the Straus building, Chicago. The meeting was addressed by T. H. Strate, division engineer, Chicago, Milwaukee, St. Paul & Pacific, Chicago; P. V. Thelander, division engineer, Chicago & North Western, Chicago; H. C. Koch, roadmaster, Belt Railway of Chicago, Clearing, Ill.; and S. H. Shepley, supervisor of track, Elgin, Joliet & Eastern, Joliet, Ill., on the subject, Winter—What We Are Doing to Meet Its Problems.

The next meeting of the club will be on January 24, at which meeting C. B. Bronson, inspecting engineer, New York Central System, will show the film of recommended rail laying practices made by this road to teach these practices to its maintenance men. Mr. Bronson will discuss the reasons for these practices and the development of this film.

American Railway Engineering Association

Upon the suggestion of C. H. Buford, vice-president, operations and maintenance of the Association of American Railroads, the American Railway Engineering Association will resume its annual meetings, the meeting this year to be held in the Palmer House, Chicago, on March 14-16. Addressing a communication to the president of the A. R. E. A. as well as to the heads of the Operating, Transportation, Mechanical, Purchases and Stores and Freight Claim divisions of the association, Mr. Buford said that his suggestion for the resumption of annual meetings was prompted by the record traffic that is now being handled and that will probably continue, and the rising trend of accidents and freight claims, pointing to the growing necessity for more attention to the maintenance of roadway and equipment.

The program for the meeting in March will include the usual presentation of committee reports, but will be high-lighted throughout by special features and addresses giving consideration to specific problems arising out of the war and to future problems with which engineering and maintenance officers will be faced incident to post-war adjustments and developments.

No committees of the association held meetings during December and only the Committee on Economics of Railway Location and Operation has scheduled a meeting in January, this meeting to be held on January 26, at Chicago. Bulletin No. 442 was mailed to members during the latter half of December, and the January Bulletin of the association, No. 443, will be sent to members on or before January 15. This latter bulletin will include the reports of the committees on Iron and Steel Structures, Masonry, Waterproofing of Railway Structures, Clearances, Impact, Records and Accounts and Co-operative Relations with Universities.

Supply Trade News

General

The Kellogg division of the **American Brake Shoe & Foundry Company** has acquired the **Crown Spray Gun Manufacturing Company,** Los Angeles, Cal. **H. O. Winkler,** president of the Crown Spray Gun Manufacturing Company, has been appointed vice-president of the Kellogg division, in charge of the operation at the Los Angeles plant, which will continue to manufacture spray gun equipment.

Personal

Thomas L. Hughes has been appointed western sales manager of the Lehigh Portland Cement Company with headquarters at Chicago.

E. L. Huff, formerly electrical engineer at the Breckenridge, Pa., plant of the **Allegheny Ludlum Steel Corporation,** has been appointed chief engineer of all the company's plants.

T. M. George has been placed in charge of transportation publicity by the **General Electric Company,** succeeding **C. A. Church,** who has been appointed supervisor of publicity for the Erie, Pa., works of that company.

O. O. Lewis, branch manager of **Fairbanks, Morse & Co.,** Chicago, with headquarters at Atlanta, Ga., has been promoted to assistant general sales manager, with headquarters at Chicago, and has been succeeded by **G. N. Van Epps,** manager of the Diesel department of the Chicago branch.

V. C. Otley, has been appointed manager of creosote and pitch sales of the Barett division of the **Allied Chemical & Dye Corporation** with headquarters in New York, succeeding **Walter Buehler** who has relinquished these responsibilities after many years' service to become special representative with headquarters at Lakeland, Fla.

A. C. Lewis, special representative in the sales department of the **Railway & Power Engineering Corp., Ltd.,** has resigned to become vice-president in charge of sales of **Templeton, Kenly & Co.,** Chicago, effective January 1.

Norman V. Arntzen, a member of the sales and engineering staffs of the Pacific Coast division of **Hubbard & Company,** Pittsburgh, Pa., has been appointed district sales manager of the Southwestern district, with headquarters at Los Angeles, Cal. Mr. Arntzen joined the company in 1926 and served in the production, service and sales departments, after which he was for seven years Northwestern representative, with headquarters at Portland, Ore.

Norman V. Arntzen

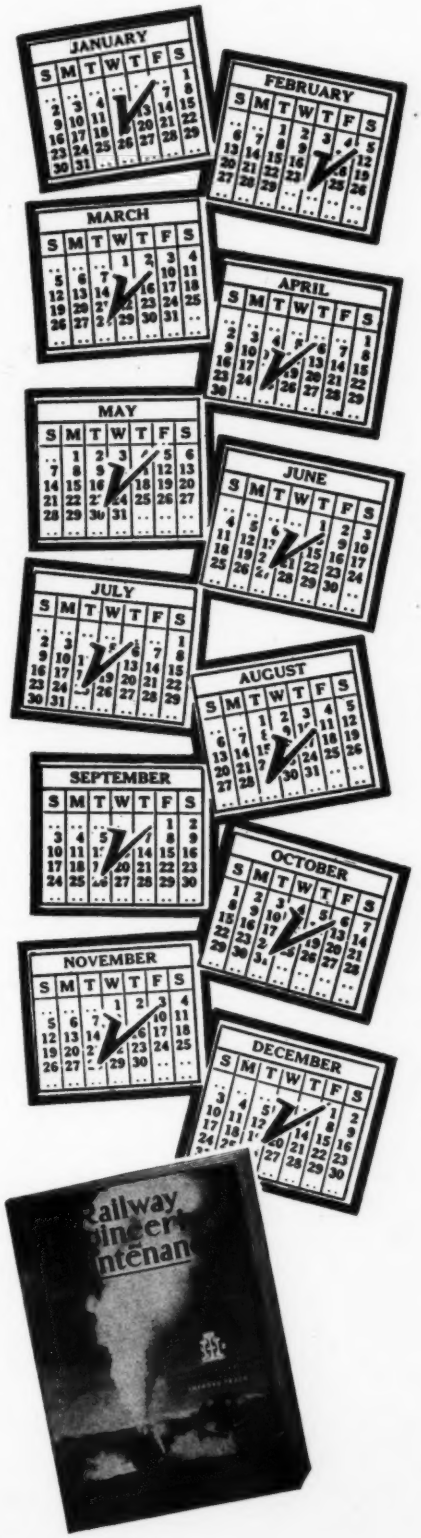
Paul Reeves has been appointed advertising manager of the **Timken Roller Bearing Company** to succeed **Roland P. Kelley,** who has occupied that position for the last seventeen years and who has resigned to go into advertising agency work.

Obituary

Ralph J. Dodds, district manager of the Oxweld Railroad Service Company, a unit of the Union Carbide & Carbon Corporation, died in Chicago on December 8. He was 45 years of age. Mr. Dodds was born in Topeka, Kan., in 1898. He joined the Oxweld Railroad Service Company in 1919 after having had general railroad mechanical and oxy-acetylene welding experience and held the positions of mechanical instructor, district superintendent, and district manager.

David W. McNaugher, vice-president and treasurer of the Robert W. Hunt Company, with headquarters at Pittsburgh, Pa., and one of the original partners in the organization of this company, died in Pittsburgh on November 24.

Every Month In 1944



Tell it in Print

"Bill, what do our railway friends ask you most frequently?" asked the railway sales manager of his star salesman.

"When can I get it?" replied the star salesman.

"I suppose that's natural in these days of such widespread delays in deliveries. But our record's good in that respect. What's their next question?"

"What'll our product do for them?"

"That's exactly what we want to get across to them. We've got a real story for them."

"That's the truth. And I find that it makes a real impression whenever I can tell it to them."

"Why that limitation, Bill?"

"Because I'm able to see so few of the men who have a part in the selection of our material."

"Why is that?"

"Because so many of them are out on the line when I call—and don't forget that a lot of these men, *and some very important ones too,* are located at out-of-the-way places that I can hardly ever get to."

"What's the answer with these men, Bill?"

"Advertising in *Railway Engineering and Maintenance.* That magazine reaches all of 'em *wherever* they're located and their offices *send* it to them when they're out on the line. I see it everywhere I go. And they read it too, for it's full of information for them."

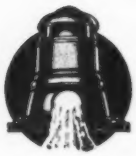
"You're right. We can put in our copy the same information that you'd tell them in person if you could call on them."

"That's my idea, Boss—and we can tell it to them *every month.*"

RAILWAY ENGINEERING AND MAINTENANCE IS READ BY MAINTENANCE OFFICERS OF ALL RANKS

The Great Wall of China
Built About 3000 B.C.

BUILT TO LAST
A LONG LONG TIME



The founders of the Layne Organization realized the tremendous importance of water as a health, safety and industrial necessity. They pledged themselves never to sacrifice quality in the manufacture of Layne Pumps and Well Water Systems. That pledge, to the ever grateful thanks of thousands of Layne Well Water System owners, has been faithfully kept.

Today as always, Layne Pumps and Well Water Systems are still being made of the very finest quality materials. They possess highly important and exclusive features of construction which measureably lengthen their long life. And in addition, they embody outstanding and thoroughly proven engineering ideas that guarantee highest efficiency.

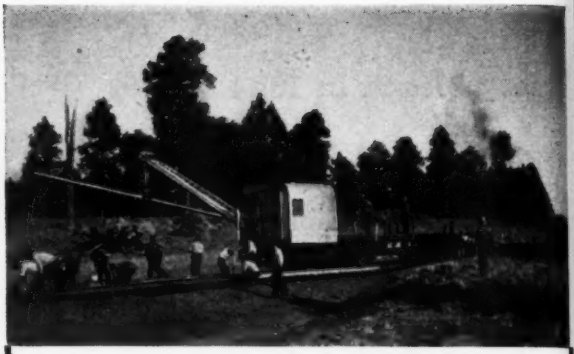
Wherever modern well water producing equipment is used—whether in the United States or in foreign lands, that which bears the name of Layne is definitely recognized as the world's standard by which all other makes are judged.

If your postwar plans call for the use of more water, Layne engineers will gladly cooperate in providing sound recommendations. For literature address LAYNE & BOWLER, INC., General Offices, Memphis 8, Tenn.

AFFILIATED COMPANIES: Layne-Arkansas Co., Stuttgart, Ark. * Layne-Atlantic Co., Norfolk, Va. * Layne-Central Co., Memphis, Tenn. * Layne-Northern Co., Mishawaka, Ind. * Layne-Louisiana Co., Lake Charles, La. * Louisiana Well Co., Monroe, La. * Layne-New York Co., New York City * Layne-Northwest Co., Milwaukee, Wis. * Layne-Ohio Co., Columbus, Ohio * Layne-Texas Co., Houston, Texas * Layne-Western Co., Kansas City, Mo. * Layne-Western Co. of Minnesota, Minneapolis, Minn. * International Water Supply, Ltd., London, Ontario, Canada.

LAYNE
WELL WATER SYSTEMS
DEEP WELL PUMPS

Builders of Well Water Systems
for Every Municipal and Industrial Need



There is no substitute for a
BURRO CRANE

Designed for, not adapted to, railway work, BURRO CRANES meet practically every railway situation:

—are low enough to travel anywhere on a flat-car.

—can travel under their own power at speeds up to 27 m.p.h.

—have a 7600 lb. draw bar pull—sufficient to pull or switch a good size work train.

—can lift self off track to clear line and be back at work in a few minutes.

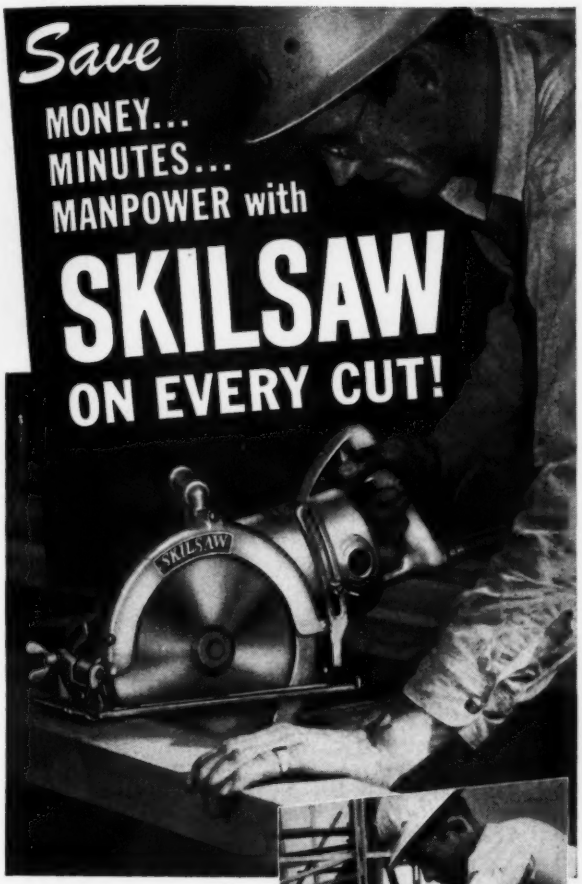
—have dozens of special and important railway features such as a *short tail swing* which permits a full swing without fouling adjacent track; elevated boom heels for working directly over high gondolas and ben walls, fittings for attaching ballast spreaders, pile drivers, magnets, buckets, drag lines, etc.

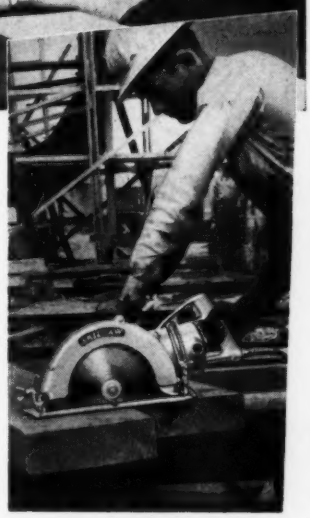
No matter what work is to be done, maintenance, construction or stores, if it's railway work a BURRO will do it easier, faster and more efficiently—there just isn't any substitute for BURRO CRANES.

Write for Bulletin F-100 and F-110.

CULLEN-FRIESTEDT CO.
1301 S. Kilbourn Ave., CHICAGO, U. S. A.

Save
MONEY...
MINUTES...
MANPOWER with
SKILSAW
ON EVERY CUT!





Your Bridge and Building Crews will get more work done, in far less time, when they're equipped with fast-cutting SKILSAW! It speeds all sawing of wood, metals, stone and compositions . . . cuts daps in ties . . . saws all lumber for bridges, trestles, guard rails and buildings.

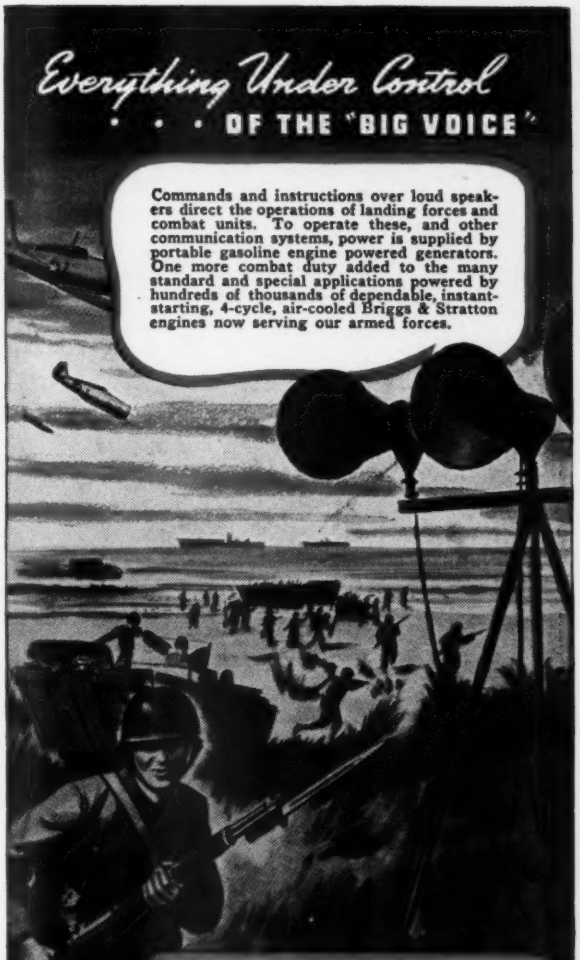
SKILSAW is lighter, more compact for *easier handling* . . . yet it's more powerful for *greater sawing speed.* Works from light socket or portable generator . . . goes right to each job and eliminates material handling. Economical and efficient for large or small crews. Ask for a demonstration of SKILSAW *today!*

SKILSAW, INC.
5053 Elston Ave., Chicago 30, Ill.
Sales and Service Branches in All Principal Cities

SKILSAW PORTABLE ELECTRIC TOOLS
★ MAKE AMERICA'S HANDS MORE PRODUCTIVE ★

Everything Under Control
. . . OF THE "BIG VOICE"

Commands and instructions over loud speakers direct the operations of landing forces and combat units. To operate these, and other communication systems, power is supplied by portable gasoline engine powered generators. One more combat duty added to the many standard and special applications powered by hundreds of thousands of dependable, instant-starting, 4-cycle, air-cooled Briggs & Stratton engines now serving our armed forces.



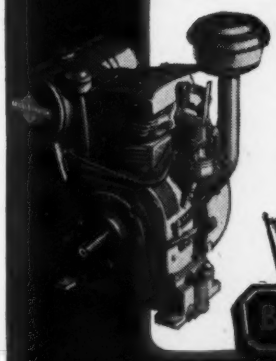
INQUIRIES are requested from those manufacturers who require portable gasoline engine power for war production — or for their post-war gasoline-powered equipment now being planned.

We are better prepared than ever to carry on the traditions of Briggs & Stratton engines — with the same high standards of quality and precision manufacture, their rugged dependability, easy starting and economical performance — all the features that have earned for Briggs & Stratton the reputation as builders of "the world's finest air-cooled gasoline engines."

"It's powered right—when it's powered by Briggs & Stratton."

BRIGGS & STRATTON CORP.
MILWAUKEE 1, WIS., U. S. A.

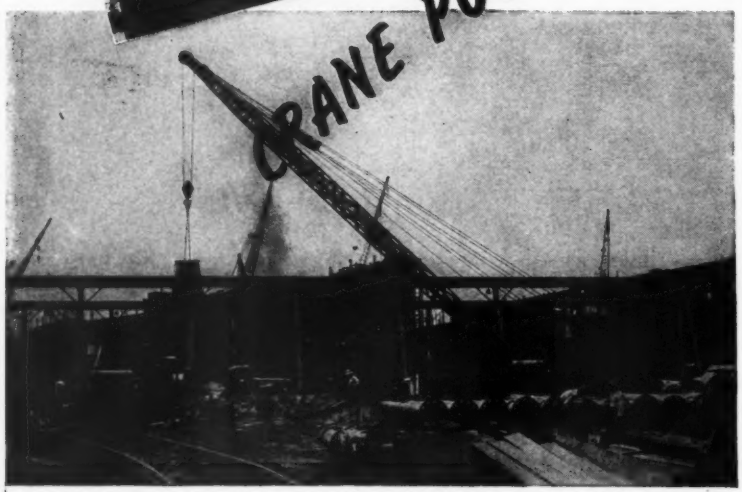
BACK THE ATTACK
BUY WAR BONDS



4 CYCLE
BRIGGS & STRATTON
GASOLINE ENGINES

Below: An I. B. Crane at work in a large U. S. shipyard. Left shows close-up of Monitor-type cab allowing operator 360° visibility.

CRANE POWER MAKES SEAPOWER

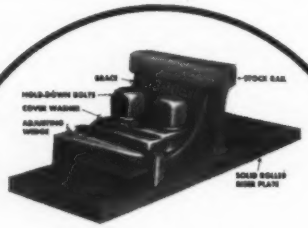


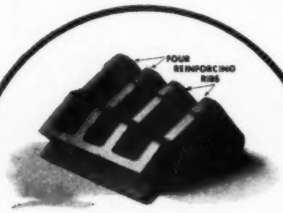
The great leap ahead that America has made in sea power since Pearl Harbor is in no small measure due to efficient material-handling equipment such as Industrial Brownhoist Cranes.

And not only in shipyards, but also in manufacturing plants, on railroads, on docks—wherever you find heavy material handling work—you will find Industrial Brownhoist Cranes. I. B. Cranes are working hard and fast up to 24 hours a day, seldom requiring time out for repairs.

Whether you handle heavy materials with magnet, hook, or bucket, I. B. Cranes can help you speed up your production for war or peace. For complete facts write to Industrial Brownhoist Corporation, Bay City, Michigan. District offices: New York, Philadelphia, Pittsburgh, Cleveland, Chicago.

INDUSTRIAL BROWNHOIST BUILDS BETTER CRANES





For Safety's Sake Under Today's Exacting Traffic

Morden Security Adjustable Rail Brace

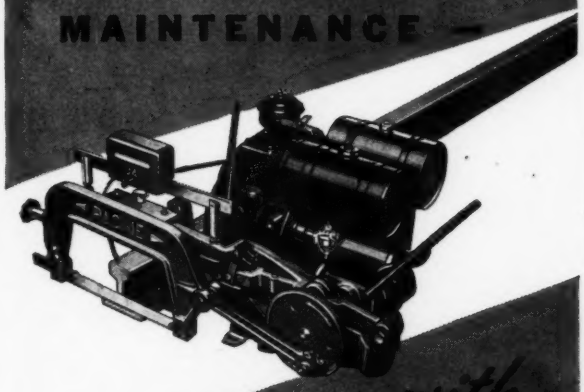
The improved Morden Security Brace is specially designed to meet the needs of wartime traffic by providing adequate support for rails subjected to the thrust of heavy wheel loads. The Brace is adapted particularly for use in split switches and slip switches in interlocked territory where it is essential to hold stock rails to proper gage and alinement.

Simple in design, the Brace can be quickly installed, adjusted or removed, without disturbing either rail, tie or plate. Rigorous loading tests have shown that the Security Brace will support a weight of 50,000 lb. at a 45 deg. angle, with a spread of only ⅛ in., and a spread of only one inch when this weight is raised to 200,000 lb.

For more than 60 years Morden has pioneered in the construction of frogs, switches, crossings, guard rails, gage rods, rail braces and security track work. Let our engineers help you solve your track maintenance problems.

Morden Frog and Crossing Works
CHICAGO 3, ILL

Speed TRACK MAINTENANCE —



with—

RACINE Portable High Speed RAIL CUTTING Machines

Faster wartime schedules—heavier loads—manpower shortages—are all contributing factors in increasing your maintenance-of-way problems. Despite these handicaps the Nation's railroads must continue to deliver the goods.

One important phase of "track maintenance" is rail cropping. Leading railroads throughout the country have solved much of their maintenance trouble by the use of RACINE Portable High Speed Rail Cutting Machines.

Crop rail ends on the track or in the yard, quickly, accurately and clean. The danger of rail failure due to change in grain structure that may occur under the torch or nick-and-break method of cropping is eliminated.

The use of a RACINE Portable Rail Cutter results in a better fitting, stronger rail joint at switches, curves, interlockings and crossings. Write for catalog 58A. Address Dept. RM-S.

RACINE RAIL CUTTERS provide these features

1. **PORTABLE** — Light in weight — two men can carry it. One man operates it.
2. **ECONOMICAL** — Low blade cost, small operating overhead, and minimum man-hours reduce maintenance expense.
3. **FAST** — Cuts 85 lb. rail in 5 min.; 100 lb. rail in 7 min.; 130 lb. rail in 9 min.
4. **BETTER** — Accurate cut — no damage to grain structure from heat or break.

All models are available with gasoline engine, electric or air motors.

RACINE
TOOL and MACHINE COMPANY
Standard for Quality and Precision
RACINE, WISCONSIN, U. S. A.

STANDARD FOR QUALITY AND PRECISION — RACINE TOOL and MACHINE CO.

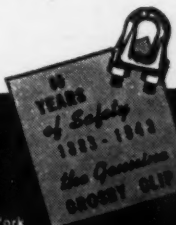
HELPING THE RAILROADS TO DELIVER —

the AMERICAN REVOLVER

Here is another example of the versatility of the AMERICAN REVOLVER for handling heavy and bulky loads. With a style and type of mounting suited to requirements, the long boom covering a large area, and the great lifting capacity of this machine make it an efficient, speedy materials handling unit for all industry.

Whether for furthering the war effort, or for post-war planning you should have full particulars on the AMERICAN REVOLVER.

Write for catalog
601-R-1B



AMERICAN HOIST AND DERRICK CO.
SAINT PAUL 1, MINNESOTA
Chicago San Francisco New York

AMERICAN TERRY DERRICK CO. . . . . South Kearny, N. J.

Mall TRADE MARK PORTABLE POWER Tools

KEEP MAINTENANCE MOVING

Mall TRADE MARK CHAIN SAW

5 H.P. **GASOLINE ENGINE MODEL**

36" Capacity. Also available in 24" and 48" sizes. .Pneumatic Models if desired.

Cuts heavy timber and piling in a fraction of the time required by hand. Automatic clutch prevents stalling the engine when saw is forced or pinched too hard. Swivel feature permits cuts at necessary angles. Easily and quickly sharpened on the job.

Mall TRADE MARK CONCRETE VIBRATOR

1½ H. P.

Places low-water-cement-ratio concrete faster and better than can be accomplished by any other method and assures a stronger, watertight job free from honeycombs and voids. Variable speed gasoline engine also operates 8 other interchangeable tools for Wet Wall Rubbing, Sanding, Grinding, Wire Brushing, Drilling, Sawing, Pumping and Sharpening Tools. Other gasoline engine, electric and pneumatic models also available.

Mall TRADE MARK 5 H.P. Off-the-Track PORTABLE POWER UNIT

The MALL easily portable, 5 H.P., off-the-track unit is always ready for work. No time lost looking for power lines—repairing air lines or hose connections. It operates all day on very little gasoline—runs by itself and furnishes plenty of power to drive quickly interchangeable attachments for Rail Switchpoint, frog and crossing Grinding, Sanding, Wire Brushing, and Drilling in Wood, Brick, Concrete or Steel.

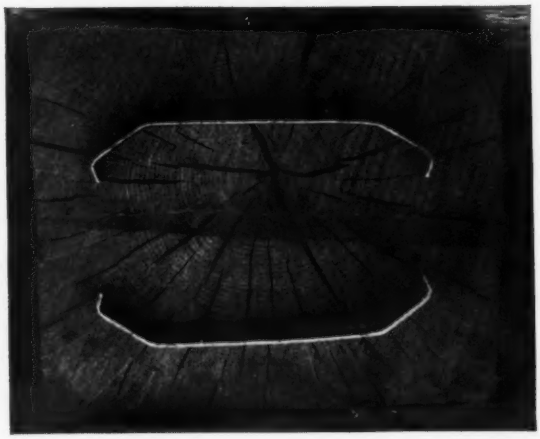
Literature and prices upon application.

RAILROAD DEPARTMENT

MALL TOOL COMPANY

7746 SOUTH CHICAGO AVE. CHICAGO 19, ILLINOIS

Selecting the RIGHT Tie Iron Is As *IMPORTANT* . . .



As Picking the Right Man for the Job!

With the increasingly acute shortage of ties, the selection of the right tie iron to protect the ties one has against splitting and checking assumes added importance. It becomes as important as picking a man for a life-time job.

BEEGLE Saf-Tie Irons are scientifically designed to meet the fundamental requirements of proper placement and secure anchorage. The Beegle Saf-Tie Iron and the Beegle Method of double ironing are the result of many years of intensive study and practical experiments to determine the most effective method of combatting the ever-present tendency of many timbers to check in seasoning and in service.

OUTSTANDING ADVANTAGES OF THE BEEGLE METHOD OF DOUBLE IRONING

1. It reinforces both the upper and lower areas of the end sections of the tie against splitting;
2. It provides a balanced reinforcing which neutralizes the normal tendency of the tie to split and prevents the spreading of the resultant sections;
3. It provides marginal defense in the areas of sapwood where splitting begins and is most severe;
4. It prevents the eventual exposure of untreated wood;
5. It adds substantial mechanical strength to the natural strength of the tie.

There is Only One BEEGLE Iron

THE ORIGINAL . . . AND STILL THE BEST

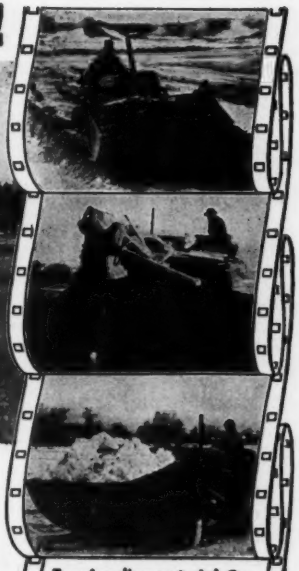
BEEGLE

TIE SERVICE COMPANY

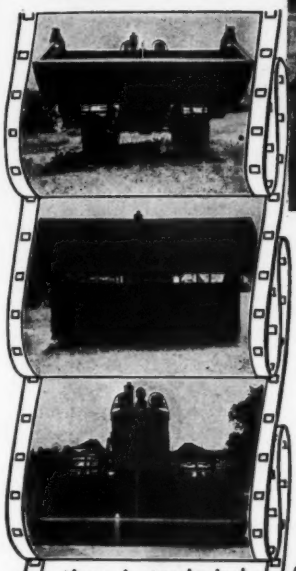
EAST ST. LOUIS ILLINOIS

GRABS HOLD OF ANY JOB!

Drott Bull Clam Shovel



Top: Loading material. Center: Dumping material. Bottom: Special snow bucket.



Above: In closed raised, opened down and closed down positions.

Fits in anywhere . . . everywhere! No limit to its applications. Does the work of a bulldozer, shovel, scraper, tamper, grader, maintainer, hoist, clam, snow-remover. Uproots and carries stumps and trees, lays pipe, tile or cable, spreads gravel, digs ditches and trenches. Cuts smoothly while it travels . . . carries or floats loads . . . levels as it fills. Ability is PROVED on toughest jobs. Now serving the armed forces in tough jungle fighting, on sanitary fill work, filling bomb-craters, airport construction, etc. Figure on it for your Post War work. Investigate NOW! Write for literature.

- Hydraulically controlled from operator's seat.
- Up to 3' lift above ground—one foot below.
- One to four yards heaped capacity . . . three to twelve thousand pounds lift capacity.
- Raising and lowering of front clam controls depth of cut.
- Regular bucket interchangeable with special snow bucket.

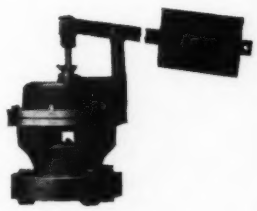
DROTT UNIVERSAL EQUIPMENT

HI-WAY SERVICE CORPORATION

3855 W. WISCONSIN AVE., MILWAUKEE 8, WIS. • 739 MUNSEY BLDG., WASHINGTON, D. C.

"VALVES"

Smooth, uninterrupted, dependable water supply relies on valves. Make sure of the best in valve service with U.S. and Halladay Valves.



U.S. Balanced Float Valve

U.S. Balanced Float Valve

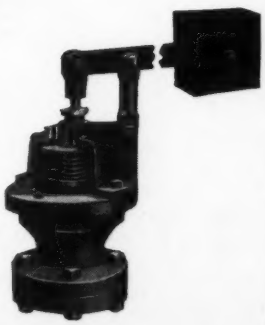
Easy to open and close; automatic; simple and well made for low or heavy pressure. Brass mounted; will not stick; no metal to metal contact in operating parts. Straight or 90 angle type.

Halladay Outlet Valve

Floats (not shown) are integral part of valves

Halladay Outlet Valve

A simple, economical valve, with or without special slow closing device.



U.S. Combination Valve

Ask for Valve Circular X

U.S. Combination Float and Outlet Valve

Same design as U.S. Float Valve except the extra advantage of an auxiliary valve to permit its use as both an inlet and an outlet valve.

U. S. ENGINE & PUMP CO.

Division of Batavia Metal Products, Inc.

Batavia ★ Illinois

Mansfield Water Columns — Wood Water Tanks — Switch Stands — General Water Handling Appliances

NO GREASE OR OIL FITTINGS

on

WISCONSIN HEAVY-DUTY AIR-COOLED ENGINES

In today's war production set-up, even the saving of fractional manpower for servicing grease cups and oil fittings is important. And neglect of this attention can mean serious damage to irreplaceable production equipment. This can't happen with Wisconsin Engines because there are no grease cups or oil fittings; no lost manpower; no chance for human error or carelessness. Wisconsin Engines are protected by positive force-feed and splash lubrication.

MOST POWER Per POUND

WISCONSIN MOTOR Corporation

MILWAUKEE, WISCONSIN U. S. A.

World's Largest Builders of Heavy-Duty Air-Cooled Engines

LUFKIN "Wolverine" Chrome Clad

LUFKIN

SAGINAW, MICHIGAN · NEW YORK CITY

TAPES · RULES · PRECISION TOOLS

JORDAN

Snow Plow - Spreader - Ditcher

In Fall
Widens Banks
Drags Material out of Cuts

In Winter
Plows and Spreads Snow—
Flanges out Ice

Versatile—Efficient—Economical—Easily and Quickly Converted to take care of a multitude of jobs.

In Spring
Ditching and Roadbed Shaping

In Summer
Straight Wing Spreading
—Flanging Ballast

On the Job Four Seasons a Year Does the Work of an Army of Men!

O. F. JORDAN COMPANY

WALTER J. RILEY, *President*

EAST CHICAGO INDIANA

Specify Q&C Step Joints For Dependable Service

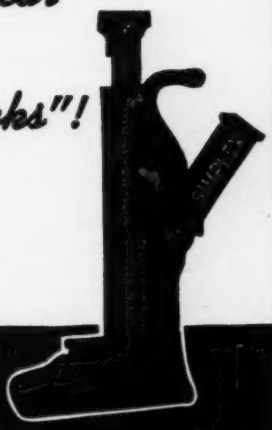
Designed for maximum strength and resistance to impact, furnished either of Alloy Cast Steel or of Rolled and Forged Steel, both heat-treated. Allowance for wear is made when specified to provide the best possible surface, preventing battering of rail ends, and thus reducing maintenance costs.

ASK FOR Q&C STEP JOINTS ON YOUR REQUISITION

THE Q AND C COMPANY

Chicago New York St. Louis

Internal Wear "Stopped In Its Tracks"!



Simplex No. 217 Track Jack. 15-tons capacity. Height 22¾". Lift 13". Toe lift 2½" from ground level. Weight 60 lbs.

The patented electrided gibs of Simplex Track Jacks embody maximum resistance to wear. Service life is five times greater as a result. Internal wear is further balked by the hardened steel plate inserted in housing at top of gib section.

Templeton, Kenly & Co., Chicago 44, Ill.
Cutting Railroad Operating Costs Since 1899

For More Effective Use of Manpower
Employ Simplex Bridge Jacks, G-Y Tie Spacers, Rail Pullers and Expanders.

Simplex LEVER · SCREW · HYDRAULIC **Jacks**

ELECTRICITY
For All Railway Jobs

ONAN ELECTRIC GENERATING PLANTS provide electricity for all Railway Maintenance and Construction Work, stationary, mobile or emergency. Especially suited for heavy duty service because of their rugged, compact construction.

Thousands of these units are doing a war winning job on all fighting fronts.

Model shown is from W2C series 2 and 3KW

Sizes: 350 to 35,000 watts. 50 to 800 cycles, 110 to 660 volts, A.C.—6 to 4000 volts, D.C. Also A.C.-D.C. Models.

Your inquiry regarding present or post-war needs will receive prompt attention.

D. W. ONAN & SONS
3163 Royalston Ave.
Minneapolis, Minn.

Awarded to each of Onan's 4 Manufacturing Plants.

ONAN

HOW TO
PATCH FLOORS
. . . While Traffic Rolls

Here's a new, fast way to patch broken concrete without having to close off the area. Use durable INSTANT-USE . . . a tough, plastic material which you simply shovel into hole—tamp—and run traffic over immediately. NO WAITING. Bonds tight to old concrete. Makes smooth, solid, heavy-duty patch. Withstands extreme loads. Keep a drum on hand for emergencies. Immediate shipment.

Request Descriptive Folder

MAKE THIS TEST

FLEXROCK COMPANY
3647 Filbert St., Philadelphia 4, Pa.

Please send me complete INSTANT-USE information . . . details of FREE TRIAL OFFER—no obligation.

Name _____
Company _____
Address _____

the PUMP that is "Self-Adjusting for Wear"

for handling

DIESEL FUEL and FUEL OILS

BLACKMER ROTARIES

have been standard equipment for more than forty years.

POWER PUMPS

5 to 750 GPM. Pressures to 300 psi.
Single or multiple units.
All standard drives.

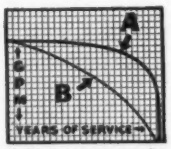
HAND PUMPS

7 to 25 GPM—54 Models.
Write for Bulletin 304—
FACTS ABOUT ROTARY PUMPS

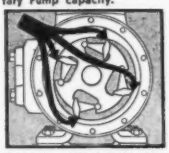
Blackmer Pump Company

2140 Century Ave., Grand Rapids 9, Mich.

BLACKMER ROTARIES
POWER PUMPS · HAND PUMPS

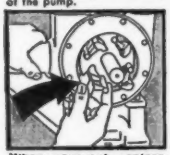


A—Blackmer pump capacity. Note the long sustained efficiency. B—Conventional Rotary Pump capacity.



Wear is confined to the tips of the buckets, which automatically compensate for wear.

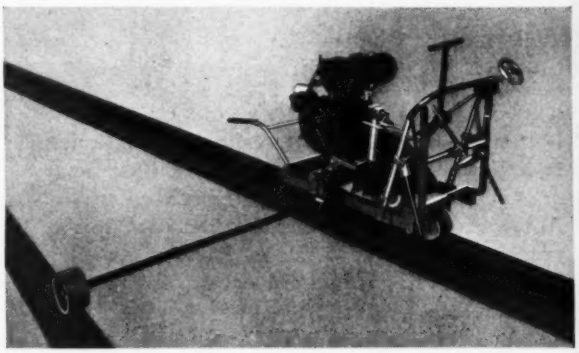
This much can wear away, without affecting the capacity of the pump.



When worn out, replace the buckets and the pump is restored to normal efficiency.

EXTENDS THE LIFE OF OLD RAILS

Old rails carried over beyond their normal life are maintained more easily—with a saving in manpower—by the use of Railway Track-work Grinders. They quickly smooth rough track, accurately grind off overflowed metal from welded rail ends. Used by leading railways. Write for data bulletins giving facts on characteristics and operation of various models.



Model P-16 Railway Track-work Grinder—one of many models.

Railway Track-work Co.

3132-48 East Thompson St., Philadelphia

5165

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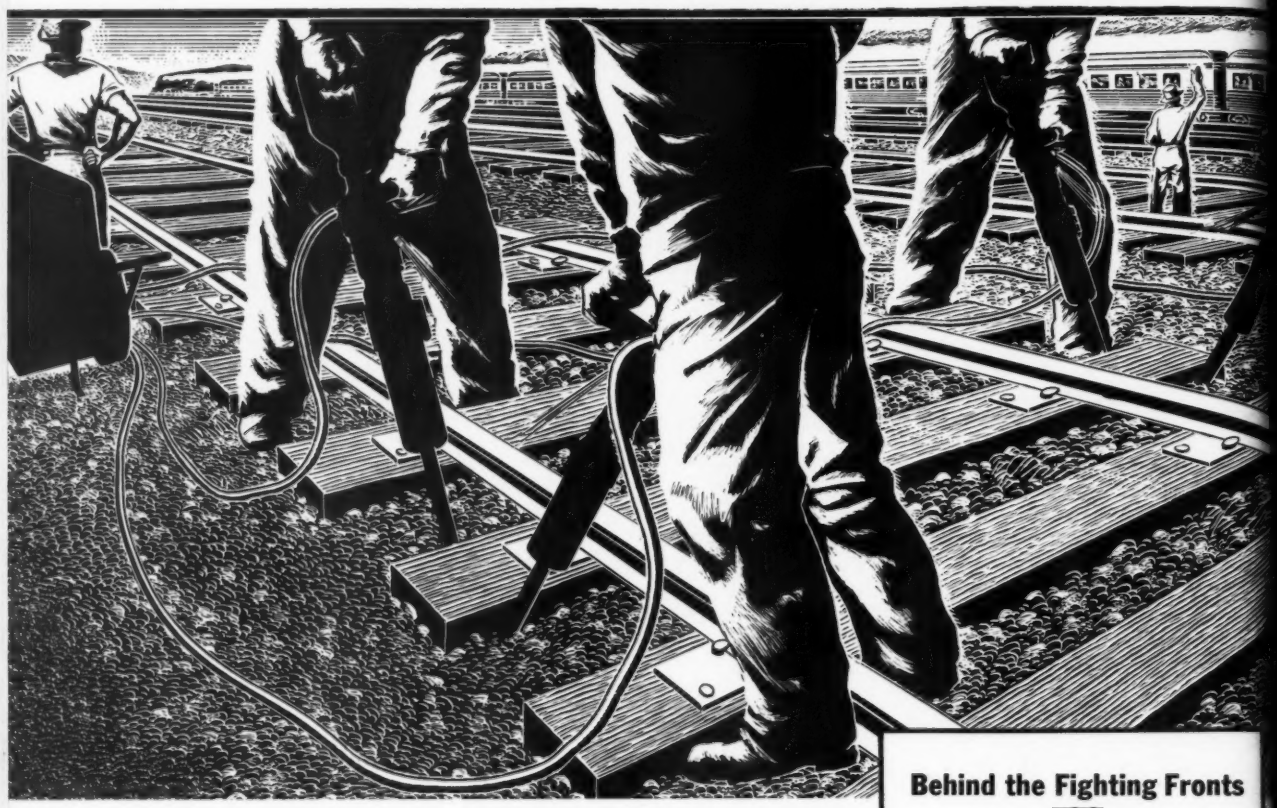
No matter how great the load nor how terrific the shocks of heavy traffic— our *surplus reserve* of *spring power* maintains bolt tension, and protects rail ends and joint bars.
IMPROVED
HIPOWERS
IMPROVE TRACK
THE NATIONAL LOCK WASHER COMPANY, NEWARK, N. J., U. S. A.
A COMPLETE LINE OF RAILWAY SPRING WASHERS

BRUTES HELP MOVE THE 2 MILLION



When you railroad men are moving 2 million soldiers a month, a new body of troops every 6 minutes, every bit of maintenance equipment naturally must be *job-tested!*

Weaklings cough, wheeze and go under. This Blue Brute Tie-Tamping partnership has passed its war test, because, like other easy-breathing, easy-handling Brutes, it's teamed up to *work together!*

It's easy for a light, portable Hand-i-air Compressor to keep delivering 60 cubic feet per minute, just right to power four WTT-7 Tie Tampers without waste air or effort.

And that new WTT-7 Tie Tamper — only 42 pounds including tamping bar! — is stronger in design. This Brute is stripped lean for speed. Less risk of freezing. New type throttle ends air loss. Result: more lineal feet of ballast tamped per day.

Other Blue Brute compressors . . . portable, semi-portable, gasoline, Diesel or electric-driven . . . all Feather Valve* equipped . . . teamed up with Blue Brute rock drills and air tools to fit the job — *deliver* more air, *use* less air, need less repair! Try 'em.

*Reg. U. S. Pat. Off.

Behind the Fighting Fronts with

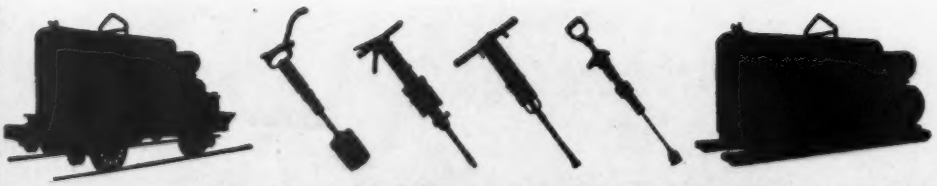
BLUE BRUTES

Blue Brutes helped equip several railway battalions for overseas duty. Here, at home, our soldiers and sailors see them in action** for track-laying and repair, as well as for new construction in Army camps, Navy yards, air bases and ordnance plants.

**Blue Brute compressors and air tools are painted olive drab for the Army, battleship gray for the Navy.

Get more WORTH from air with WORTHINGTON

BUY BLUE BRUTES



Compressors from 60 to 500 cu. ft. capacity in mountings to suit all jobs. Rock Drills and Air Tools that have always set the pace for easy operation — available in a wide range of weights and sizes.

WORTHINGTO

Worthington Pump and Machinery (poration Harrison, N. J. Holyoke C pressor and Air Tool Departm Holyoke, Massachusetts